Chemical Week

February 1, 1958

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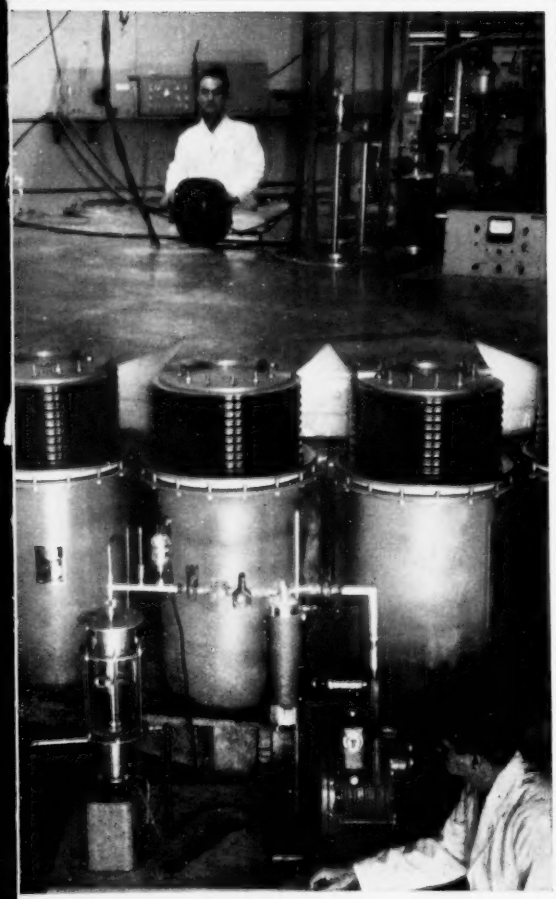

Wraps come off Fusion . . . . . p. 20

New twist in sales training; Monsanto trainees get 90 days behind buyer's desk . . . . p. 30

Electron-beam melting grooms for commercial role in refining hard-to-melt metals . . . . p. 48

Contrast in ammonium sulfate market—sliding domestic demand; brisk export business . . . p. 65

Clear film of linear polyethylene comes out of the laboratory. Low cost bolsters its bid for hefty share of packagers' dollars . p. 75

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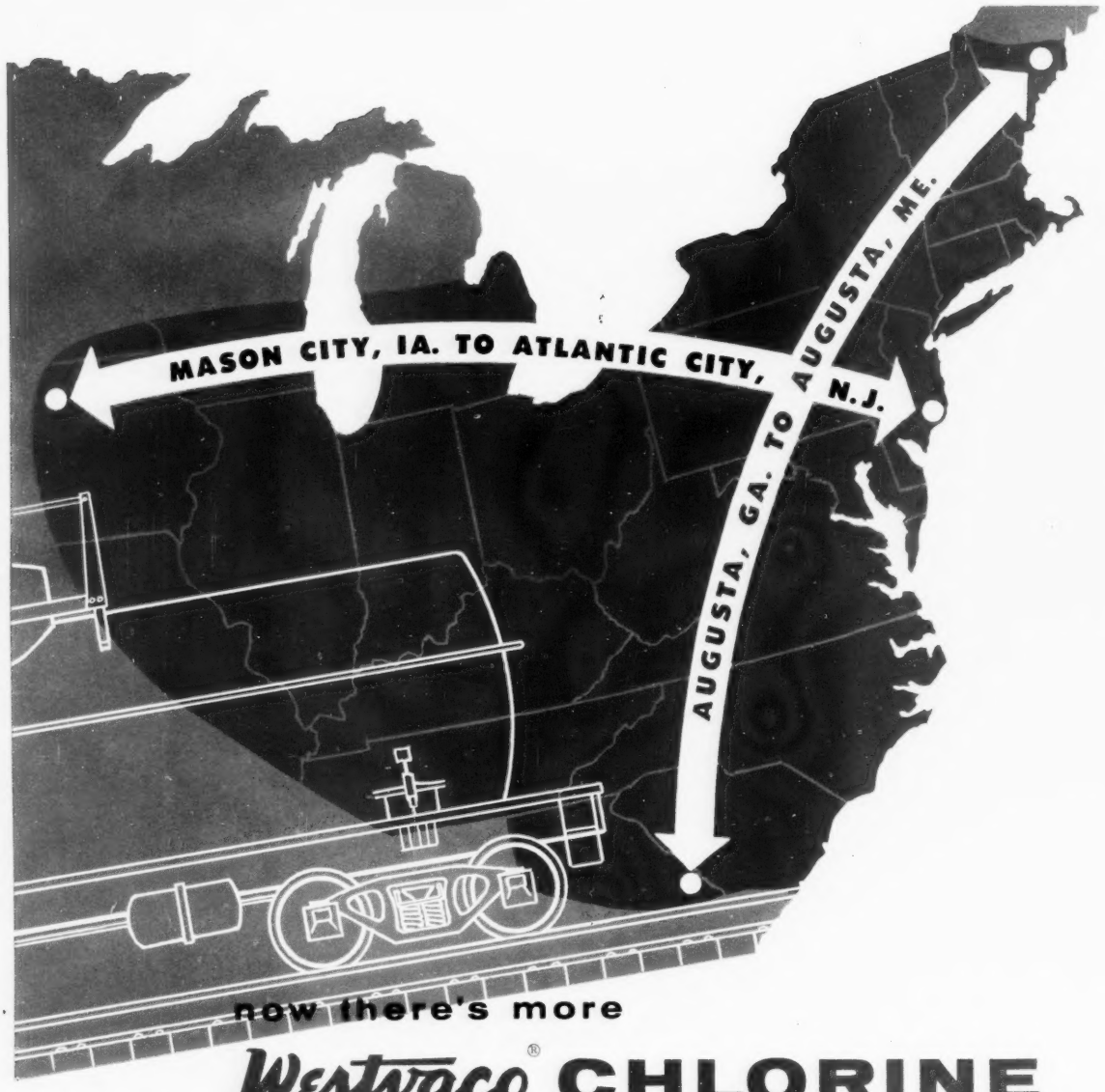

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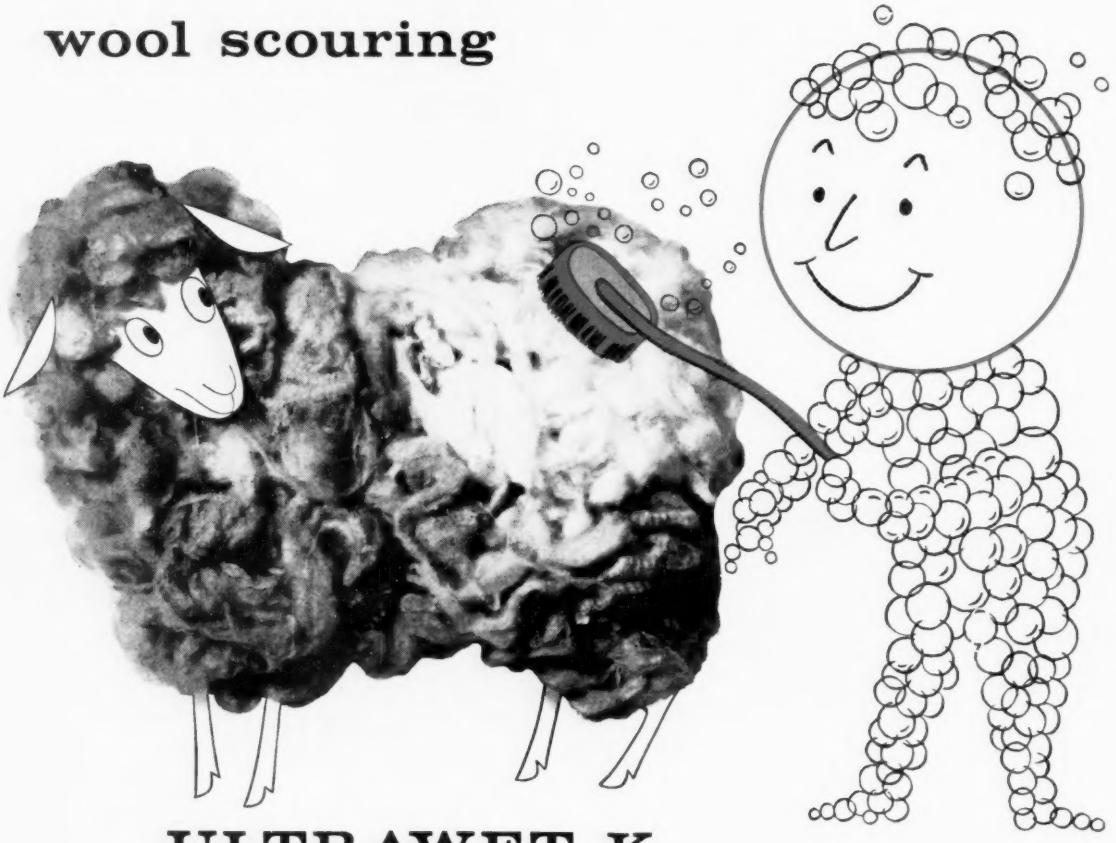

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Chemical Week

TOP OF THE WEEK **February 1, 1958**

Swiss watchmakers survey the CPI for its tariff views. Here are their findings ..... **p. 44**

High-vacuum electron-beam melting readies for commercial try-out in purification of high-melting metals ..... **p. 48**

Detergent makers overlooking a bet? Special formulation for ultrasonic washers launched by equipment maker ... **p. 55**

12 OPINION

12 MEETINGS

17 BUSINESS NEWSLETTER

20 Salient questions posed by last week's British-American furor over nuclear fusion:

How soon will fusion power be economical? British say in 10 years, but others are doubtful.

The threat to fission power—should companies working with uranium, zirconium, hafnium and the like shun further investments in those fields?

24 Wall Street hopeful about drug industry's outlook for '58, sees 8% sales rise, 5% profits hike.

Control of natural-gas pricing—state or federal matter? And CPI fuel-feedstock users ponder how a decision on this will affect costs.

Western Europe's chemical industry gains in production, productive capacity and competitive potential.

27 WASHINGTON NEWSLETTER

30 SALES
Better salesmen faster—that's aim of 90-day purchasing stint for sales trainees.

34 Contract programing brings benefits to buyer, new obligations to suppliers.

36 PRODUCTION
Multiprocess specialists at Dow's Pittsburg, Calif., plant provide technical assistance on production problems.

40 House movers show that size and shape pose no problems, move 200-ton water tank intact.

43 ADMINISTRATION
Natural barriers to unions in the South are crumbling; here are changes management should note.

44 Advertising survey appears to indicate chemical industry executives hold divergent views on tariffs.

48 ENGINEERING
Three firms join forces to commercialize new high-temperature electron-beam process. It permits continuous casting of high-purity ingots from impure metal rods, chips or powder.

55 SPECIALTIES
Ultrasonic detergent — it sounds like a "specialty" specialty, but it could be a product sleeper. The market for the product is bigger than it looks.

56 New detergent compound is especially designed for washing the half-acre surface of B-52s.

61 TECHNOLOGY NEWSLETTER

65 MARKETS
Ammonium sulfate, leader in fertilizer nitrogen as recently as '53, today takes third place in the supply line-up. But the over-all picture isn't too grim.

71 MARKET NEWSLETTER

75 RESEARCH
Two new clear linear polyethylene films lay siege to cellophane's packaging strongholds.

78 Biochemists cop annual glycerine research awards.

82 New resin boosts market potential for fluorescent dyes by enhancing their lightfastness.

86 CHARTING BUSINESS
Chemicals play an increasingly important role in recreational boating. Latest survey shows how it's paying off for the CPI.

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No. 5

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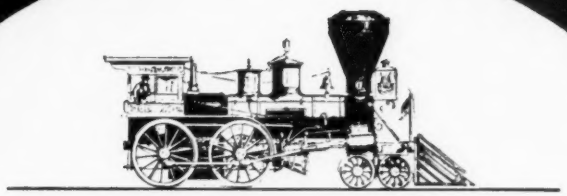

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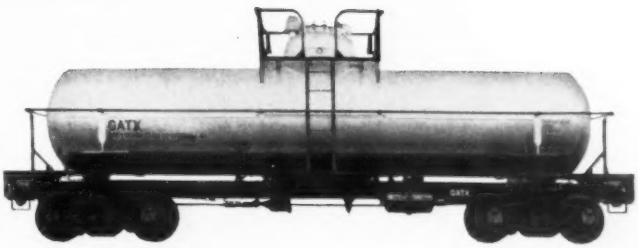

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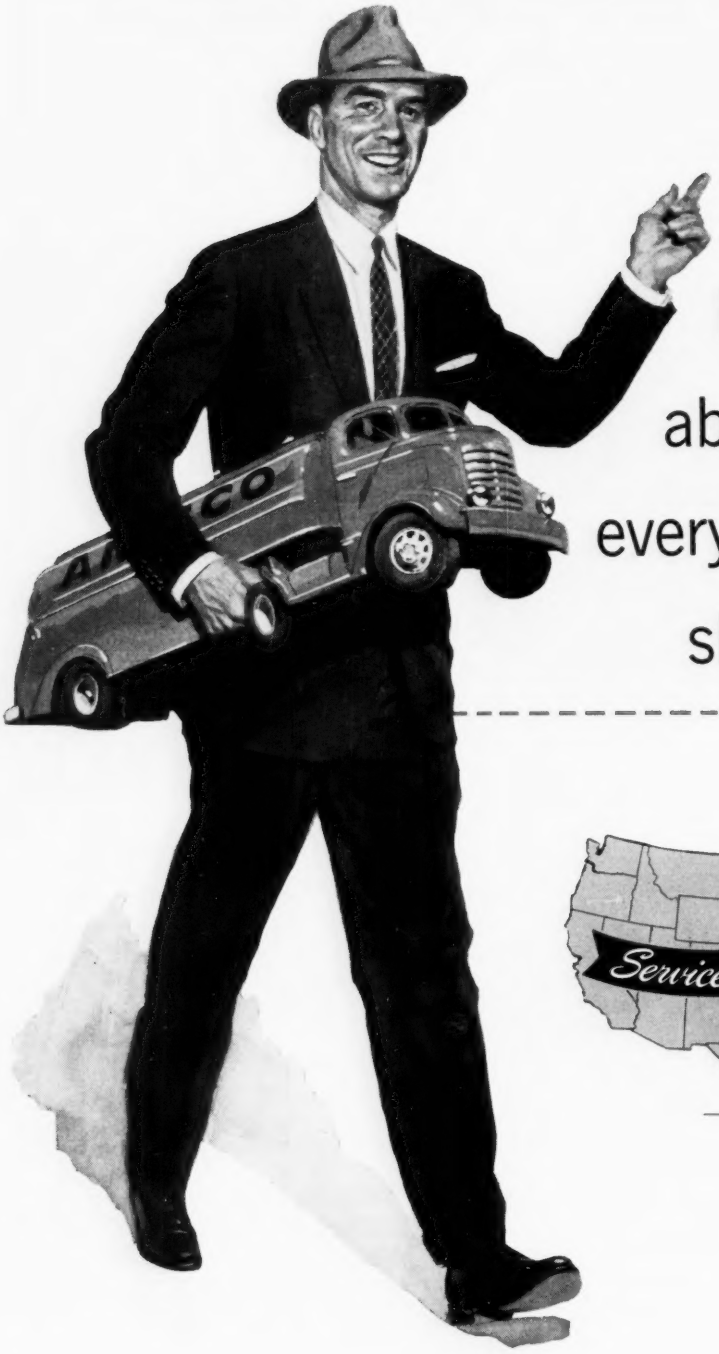

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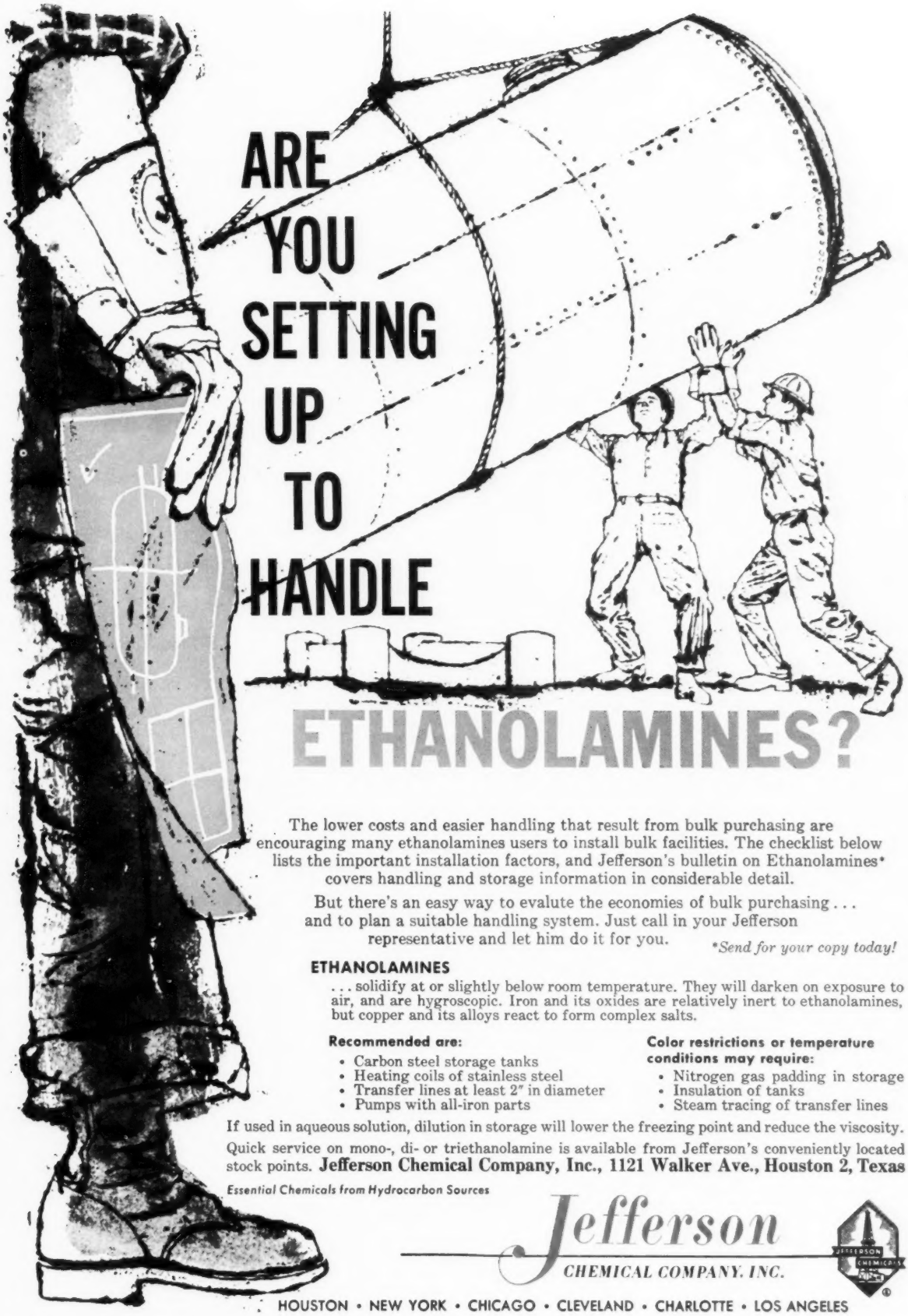

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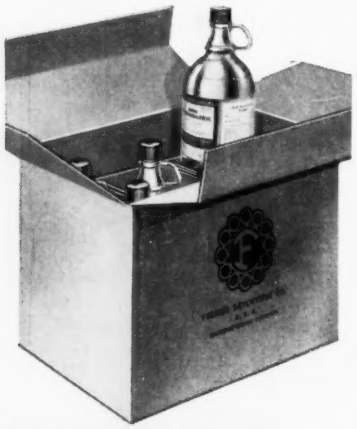

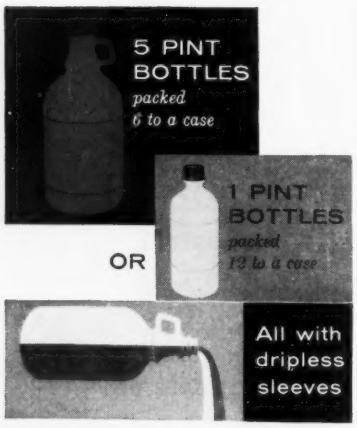

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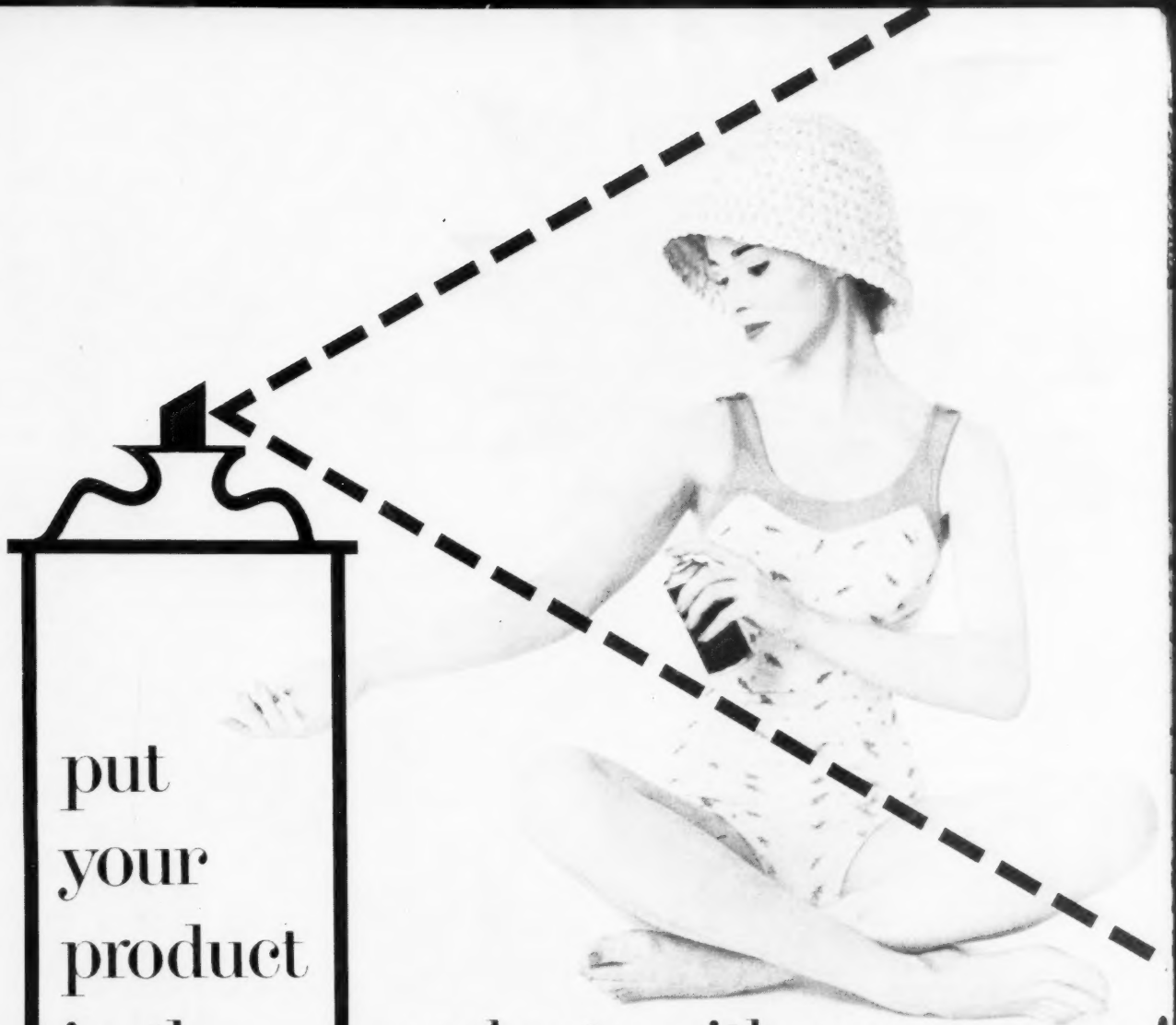

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OPINION

Misplaced Decimal

To THE EDITOR: While we appreciate your attempt to increase the use of textile fungicides a hundredfold (*Nov. 23, '57, p. 37*), should not the Air Force findings on preservation of parachute webbings actually read 0.14% copper as copper-8-quinolinolate and 0.9% dihydroxy-dichlorodiphenyl methane?

RALPH EISENSCHIML
Vice-President
Scientific Oil Compounding Co., Inc.
Chicago

Yes. The Office of Technical Services has since sent out a correction of its hundredfold-too-great figures.—ED.

Two Ways to Figure

To THE EDITOR: The [news story] "Are Depreciation Methods Outmoded" (*Nov. 16*) notes a rise in the construction cost wholesale price index of only 33% between the years 1941 and '57. Other indices—*Engineering News-Record*, for example—indicate a rise well in excess of 100% over the same period. Does your indicated low rise reflect, perhaps, some discounting due to technological advance?

NORTON M. SMIRLOCK
The Atlantic Refining Co.
Philadelphia

The figure of 33% is a discounted one, not only for technological improvement, but because of the weighting necessary to match the expenditure pattern.

It works this way: If the total expenditure had been made in '41, it would cost more than 100% more to replace it. But this is not the case. Actually the total capital outlay is a sum of increasing parcels spent each year; thus, the greater part has been spent during the latter years. Hence, replacement cost for each latter year's outlay is relatively less, compared with original cost, than for each earlier year.—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

Buyers' Guide Omission

To THE EDITOR: We were understandably chagrined by the omission of Bakelite Co. from the listings in the current edition of the *Chemical Week Buyers' Guide*. There was undoubtedly a failure of communications somewhere along the line. However, just for the record, we should like your readers to know that we are manufacturers of the following products:

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  Polyethylene
  Polystyrene
  Polyvinyl Chloride
  Vinyl
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ARTHUR J. KEENAN
Bakelite Co.
New York

There was indeed a failure of communications somewhere along the line. We are glad to publish this list, since the BUYERS' GUIDE *suffers by omission of this important supplier.*—ED.

Where Winds the Ouachita

To THE EDITOR: Please note that [the enclosed] copy of the map of Louisiana has been corrected to show both Sterlington and the Ouachita River. The Black River is formed when the Ouachita and other rivers converge.

JOHN H. BROWNE
Columbian Carbon Co.
Monroe, La.

CW duly notes that the Ouachita River converges with the Black River at Jonesville, La. Dredging authorization is for the Black River until it becomes the Ouachita and then carries on for the Ouachita. Though CW's article covered the waterway only for Louisiana, Arkansans will be pleased to know that the authorization for deepening extends all the way to Camden, Ark.—ED.

MEETINGS

Instrument Society of America, chemical and petroleum instrumentation conference, Hotel Du Pont, Wilmington, Feb. 3-4.

International Management Division of American Management Assn., conference on effect of European common market on overseas operations, Biltmore Hotel, New York, Feb. 3-5.

Reinforced Plastics Division of Society of Plastics Industry, 13th annual technical and management conference, Edgewater Beach Hotel, Chicago, Feb. 4-6.

American Chemical Society, Philadelphia section, second Delaware Valley regional meeting, Sheraton Hotel, Philadelphia, Feb. 5.

Chemical Market Research Assn., joint meeting with **National Assn. of Purchasing Agents;** subject: economic projections, Sheraton-Park Hotel, Washington, Feb. 6.

National Society of Professional Engineers, spring meeting, Michigan State University, East Lansing, Feb. 13-15.

American Institute of Mining, Metallurgical and Petroleum Engineers, annual meeting, Hotel Statler and Hotel Sheraton-McAlpin, New York, Feb. 16-20.

Chemical Institute of Canada, 12th divisional conference, protective coatings subject division, Toronto, Feb. 20; Montreal, Feb. 21.

1958 Nuclear Congress, International Amphitheatre, Chicago, March 17-21.

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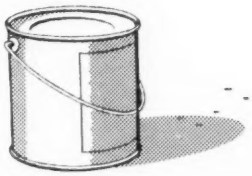

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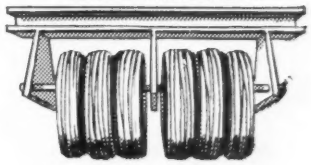

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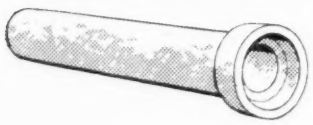
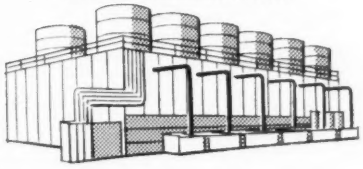


WOOD PRESERVATION



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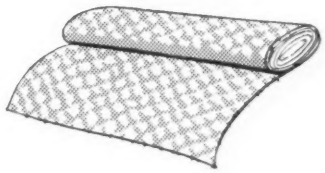

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SHELL

Business
Newsletter

CHEMICAL WEEK
February 1, 1958

Capital expenditures for general organic chemicals are still riding high, although chemical industry expansions are tapering off slightly from the '57 peak. This is evident in the Manufacturing Chemists' Assn. 1957-59 construction survey out this week.

The organics ranked first on all four counts in the new survey: cost of projects completed during 1957, $297.4 million; projects under construction, $517.6 million; projects planned for completion before 1960, $172 million; and total for 1957-59 completion, $987 million.

But in rate of growth, three other categories are moving up fast:

• Petrochemicals, whose 1957-59 total—$242.4 million—is more than 2½ times as large as the 1956-58 sum. In last year's MCA survey, cost of planned projects for chemicals from petroleum and natural gas aggregated $48.5 million; this year, the corresponding total is $104.75 million.

• Plastics and resins, whose planned projects one year ago were valued at only $24.7 million and now stand at $151.5 million.

• Chemical process metals, with the largest absolute increase in three-year expansion totals. For 1956-58, the total was $465.6 million; the 1957-59 figure is $614.8 million. The $149.2 million increase includes a $107.6 million rise in projects under construction and a $30.2 million boost in projects planned.

Slackening in rate of expansion shows up in fertilizer chemicals, textile fibers, and general inorganic chemicals.

Over-all, the industry's 1957-59 expansion budget is estimated at $3.845 billion, a 5% increase over the 1956-58 total. The gain stems largely from the fact that projects completed during '57—total cost $1.302 billion—amounted to 10% more than the '56 figure, $1.161 billion. Cost of projects under construction rose from $1.781 billion as of Jan. '57 to $1.835 billion in Jan. '58; but cost of projects planned for 1958-59 completion, but not yet started—$708 million—is down from $718 million that was planned for 1957-58.

•

And still more chemical industry expansion is coming. Latest specific developments since the MCA survey was completed:

• Before the end of April, look for Amoco Chemicals Corp. (Chicago) to decide on site and precise product line for a 50-million-lbs.-a-year oxo-process alcohol project approved last week. This plant—to be built on company-owned land, probably either on the Gulf Coast or in the Midwest—will expand Amoco's capacity for iso-octyl and decyl alcohols, and put tridecyl alcohol in the company's catalog. Also, Amoco is considering broadening the plant to include C_4 and C_5 oxo derivatives.

• Eastman Kodak Co. (Rochester, N.Y.) is planning to increase its capital expenditures this year to a record $62 million, more than half of which would be for chemical operations. The company's '57 capital improvement budget was about $60 million; total since '46 is more than $500 million. About $22 million of this year's sum is earmarked for the Tennessee Eastman and Texas Eastman plastics, fibers and industrial chemicals facilities at Kingsport, Tenn., and Longview, Tex. About $35 million is ticketed for plants and headquarters at Rochester.

•

That 1957 was a good year for the process industries generally is attested to by some of the latest financial returns. Nearly all annual statements out so far tell of higher sales than in '56; and most of them also report higher earnings.

Among early returns, highest relative increases over 1956 earnings are listed by Ansul Chemical and Smith, Kline & French, both of which had record sales and earnings last year. Other firms with gains in net income: Air Reduction, up 5% to $16.5 million; American Agricultural Chemical, up 10.3% to $440,545; Dow, up 1.5% to $57.1 million (12 months ending Nov. 30); National Distillers & Chemical, up 1.7% to $23 million; and Monsanto, up 6.8% to $48.9 million.

Allied Chemical's total '57 net income was $51.2 million, but this includes $7.8 million profit on sale of U.S. Steel stock. Actual operating income was $43.4 million compared to the previous year's $47 million.

Cash dividend payments in 1957 were up all along the line; for stockholders of companies making chemicals and allied products, these checks rose by 5.5% to a $902.3 million total. And despite pessimistic forecasts of a few months ago, latest dividend announcements—from Monsanto, National Distillers, G. D. Searle and Libbey-Owens-Ford Glass—specify no reductions from last year's rates.

•

Pressure for stiffening the pricing provisions of the Robinson-Patman Act is building up in some Congressional quarters following two recent Supreme Court decisions:

• This week, the court cleared Standard Oil (Ind.) of a 17-year-old charge that the company had discriminated in prices to four Detroit retailers. The court reversed the Federal Trade Commission and held that Standard had merely lowered its prices in good faith to meet competitors' rates.

• Last week, the high court decided that only the U.S. government—not a private person or company—can bring an antitrust suit for injunction or triple damages on an allegation that a company is charging unreasonably low prices in order to kill competition.

Legislators with "small business" sympathies want to change the law so that (a) a private party can file such a suit, and (b) the "good faith" defense can be used only if there has been no injury to competition.

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For less exacting jobs, you still get a highly pure product in our Technical grade: 98% minimum, with only 0.4% benzoic acid at most.

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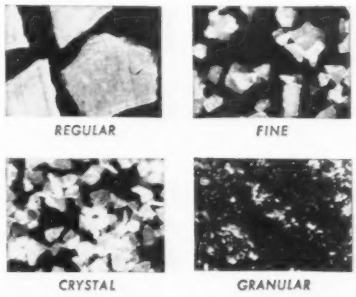

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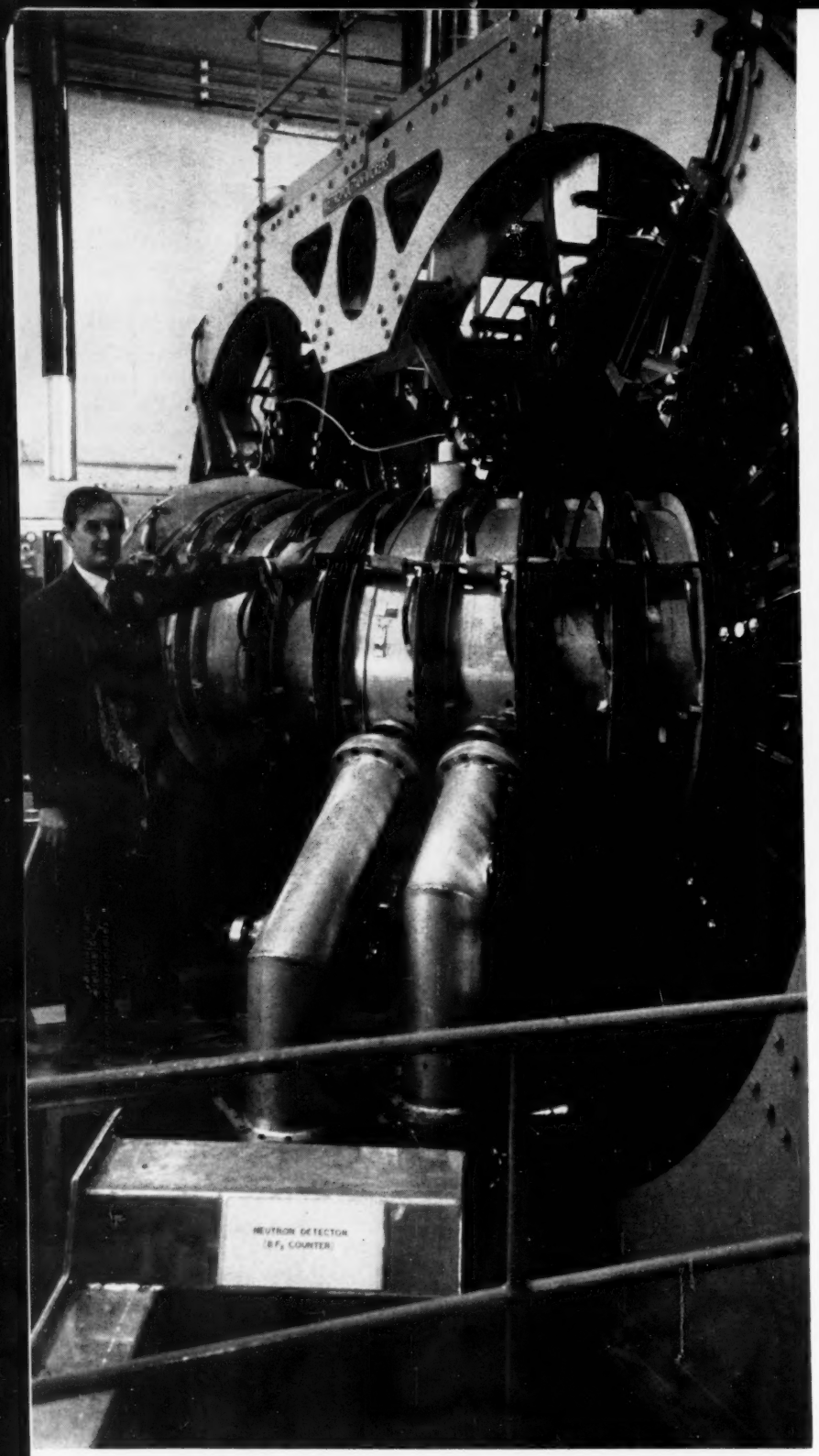
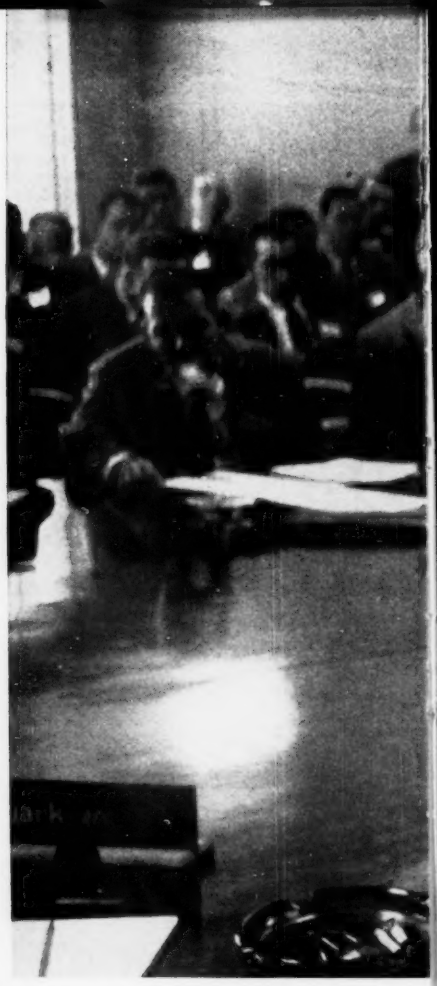


At Harwell, British scientist Robert Carruthers with 'Zeta,' in whose doughnut-shaped tube heavy hydrogen ions have been briefly heated to 5 million C in laboratory quest for controlled fusion.



Fusion-for-power will 'eventually'

Wraps Are

At press conferences in London and Washington, D. C., last week, American and British nuclear authorities lifted the veil of rumor and speculation surrounding their efforts to harness the tremendous peacetime potential of thermonuclear fusion.

Although full realization of fusion's role as a new source of power is a long way off—estimates range from 10-40 years—U.S. and British research teams are optimistic. Behind their high hopes is real progress toward attaining the fantastic temperatures needed to sustain thermonuclear fusion.

At the Atomic Energy Establishment Laboratories in Harwell, the British have achieved temperatures above 5 million C, hotter than the surface of any known star. And they have managed to hold these tempera-

be economic, says AEC Chairman Lewis Strauss in U.S. session of two-nation press conference last week.

Off Thermonuclear-Fusion Progress

tures for several milliseconds' time.

The U.S. team, headed by British-born James Tuck, at Los Alamos, N. M., has produced temperatures up to 6 million C, but has not yet learned how to maintain them for longer than a few microseconds.

Long Way to Go: Despite the strides they have made, researchers on both sides of the Atlantic are fearful of raising false hopes. They point out that neither team has reached the 100 million C necessary to sustain a thermonuclear reaction; as high as 400 million C may be required in some cases. Moreover, a pulse time of several seconds will be required.

Who's Ahead: Reports that the British are far ahead of the U.S. were denied last week by A.E.C. Chairman Lewis Strauss. He said that both countries are in close touch on the thermonuclear problem; results are regularly exchanged.

Nevertheless, the British appear to be realizing a far better return on their research investment. Exact figures on how much the U.S. is spending on project Sherwood—code name for the fusion program—have not been revealed. But estimates peg the outlay at about $23 million (*CW Technology Newsletter, Dec. 28, '57*). It's also known that over 500 persons are engaged in the program. This contrasts sharply with the $420,000 the British have spent on equipment and the 60-man team that did the work.

Asked whether the U.S. had influenced Britain to hold off news of its achievements (*CW Washington Newsletter, Dec. 22, '57*), Strauss said that both countries decided to declassify some aspects of the program early in 1958. The original release date, Jan. 31, was moved forward after the British ran into strong pressure from the press and felt a more urgent need to combat exaggerated reports.

How Soon: Estimates of when fusion will economically produce power for industry and private users vary widely. Strauss thinks that economically feasible fusion power won't be with us until the last decade of this century. But T. E. Allibone—chief of the Associated Electrical Industries Ltd. research team at Aldermaston, England—told a McGraw-Hill World News reporter last week that thermonuclear fusion will become sound engineering practice in 10 years. Allibone's group developed the Sceptre III, an apparatus similar to, but smaller than, the much publicized Zeta.

It's nigh impossible to predict the

Project Leaders: in U.S. and England, a common objective

Project leaders James Tuck at Los Alamos (left) and Peter Thonemann, Harwell, overseeing Perhapsatron S-3 and Zeta, respectively, are both looking toward the long-range prospect: direct conversion of thermonuclear energy into electric power. Theoretically, efficiency would be extremely high. If trapped particles can be made to do work against magnetic field, says Tuck, "you're half-way to a dynamo."

exact time of arrival of commercially feasible fusion power. But, right now, it seems safe that fusion will not beat fission to the payoff in civilian power generation. Strauss, in fact, states: "Every dollar now being invested in atomic-power plants using the fission process will have been amortized long before controlled fusion is found to be either economically feasible or infeasible."

The technological job done thus far has largely centered on . . .

Making a Magnetic Bottle

To fully appreciate the significance of the U. S. and British contributions, you have to look at them against the background of the tremendous problems involved in taming the brute power needed for the thermonuclear fusion of the nuclei of deuterium atoms.

Here's the theory. Deuterium atoms consists of a nucleus, made up of a proton and neutron, and an electron, which orbits around the nucleus. Heated enough, the electron wrenches free and the nucleus (a deuteron) is greatly accelerated along its random path. These particles constitute the "plasma."

Heated further, the nuclei of deuterium atoms collide and fuse, producing either a tritium nucleus (one proton, two neutrons) and a proton, or a helium-3 nucleus (two protons, one neutron) and a neutron. In either case, some of the mass is converted into energy. Energy so released is many times that obtained from conventional chemical reactions.

Problem of Heat: The difficulty in putting this principle to work is that to get the deuteron moving fast enough, you would have to heat the gas to 400 million C. But, even at 100 million C., plasma would exert a pressure of 22 million psi—assuming atmospheric pressure of the plasma at the start of heating. Finding a container to withstand such pressures and temperatures is unimaginable.

So, the first step is to use a gas under vacuum. Pressures of 0.0001 atmosphere, or even lower, are necessary. This solves the problem of final pressures as well as that of heat containment. (Gas under such high vacuum is so thin that the heat content of one liter at 350 million C is about 18,000 calories, only enough to heat a cup of coffee.)

The thinness of the gas, however, poses another problem: there are so few deuterons present that any one is more likely to hit the wall of the container than to collide (and fuse) with another deuteron. The object is to find a way to keep the gas away from the container walls.

Magnetic Bottles: Although nature has given some cruelly difficult tasks to scientists working in the fusion field, she has given them a few tricks, too. In the case of containment, it's the magnetic bottle, and one way of exploiting it is through the "pinch effect." This is how it works:

When a large electric current is passed through a gas, it sets up a heat-producing electric charge in the gas. It also sets up a magnetic field around the gas. This can be visualized as a series of circles that effectively contain the gas. The magnetic field causes the plasma to contract (the "pinch"), thus heating it even more. But the pinch must be stabilized—e.g., by a second magnetic field—to keep the plasma from wriggling.

Zeta and Perhapsatron: The pinch could be stabilized in a straight tube, but the electrodes at the end of the tube would tend to quench the reaction. A doughnut-shaped tube is better.

The British Zeta (Zero-Energy Thermonuclear Assembly) is a doughnut in which the pinch is stabilized by passing the additional magnetic field parallel to the plasma flow. Zeta has reached temperatures of 5 million C.

U.S. researchers have experimented

with straight pinch tubes and last December started up a doughnut device (cautiously labeled Perhapsatron S-3). This reached an effective temperature of 6 million C. In the Model C Stellerator to be built at Princeton, the U.S. team hopes to hit 50 million C.

What Happened? The high temperatures achieved, observations of neutrons in appreciable quantities have led both British and U. S. investigators tc be optimistic that they have indeed managed to induce thermonuclear reactions. There remains a possibility, however, that the neutrons may result from collison of deuterons with the walls of the container; or they might come from bombardment of stationary ions by deuterons.

If U.S. and British scientists have managed to produce a thermonuclear reaction, they have brought some intriguing possibilities a big step closer to reality. Case in point: Direct conversion of fusion energy into power. When deuterium is used as the fuel, 66% of the fusion energy would be imparted to the charged particles (protons, nuclei of helium and tritium). If these can be trapped within the plasma, they would tend to do work against the magnetic field holding them in. It is conceivable that this work could be converted directly into electricity at exceedingly high efficiencies. (Says Los Alamos' Tuck: "When you've reached this step, you're halfway to a dynamo.")

If, on the other hand, deuterium and tritium are used as the fuel, 80% of the energy leaves the plasma through the uncharged neutrons. These might be used to bombard lithium to generate tritium (for recycle) and helium-4. The resulting heat would be used to make steam for conventional electrical generating systems.

One of the most attractive aspects of thermonuclear power is the raw material, deuterium. It would be so effective that costs of using it for power-generation would be negligible. And there's enough deuterium to meet the world's power needs for billions of years.

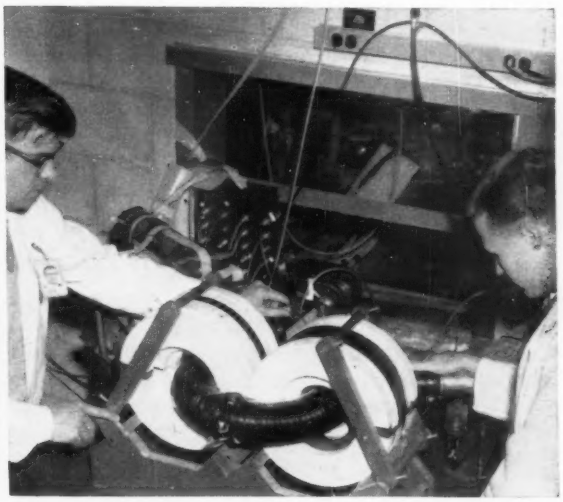
A big advantage of fusion over fission is that the former produces no radioactive by-products. Large-scale fission projects would spew out staggering amounts of long-lived radioactive waste. In addition, a thermonuclear reaction is inherently safer. Fusion requires a large input of power to keep it going; the only way it could get out of control would be for the plasma to touch the walls of the container. And that would stop the reaction.

Big Stations: Aside from its interest as a giant power consumer, the chemical process industries have important stake in the fission program. They have no comparable stake in fusion. Raw materials requirements will be relatively modest. There will be no isotope by-products, nor a need to process fuel. Right now, the prospects for small compact reactors are dim. The nature of the fusion problem indicates that economical power will require large central stations. (There's always the possibility, however, that new developments will alter this situation.)

But as the largest collective industrial consumer of electricity, the chemical process industries would be an eager customer for cheaper power. And already, the program is starting to pay dividends in new technological know-how.

So far, companies have been in no rush to participate in the development of fusion power. General Dynamics is engaged in a $10-million effort on behalf of 11 Texas utilities (*CW Technology Newsletter, May 25, '57*). Allis-Chalmers and Radio Corporation of America are designing and fabricating experimental devices for the Model C Stellerator (*CW Technology Newsletter, Oct. 26, '57*). General Electric is making a substantial effort in the field (*CW Technology Newsletter, Dec. 21, '57*).

The A.E.C.'s new policy of declassification may be what's needed to bring more companies into the fusion effort. That, in turn, could help tighten the timetable.



U.S. Machines: in cylinder or doughnut, a magnetic pinch

Two U.S. devices in quest for power from controlled fusion: left, Columbus II, whose 25 condensers pour electric power into straight pinch tube to produce up to 100 million neutrons in 1 millionth of a second at effective temperature of about 5 million degrees; right, Perhapsatron S-3, which came into operation in December, yields 1 million neutrons per discharge at effective temperature of about 6 million C. Goal is 100 million C.

Faster Buildup Abroad

Industrial chemical production, productivity, and plant capacity in western Europe are growing faster than ever before, according to an intergovernmental report out this week.

The study, carried out by the Organization for European Economic Cooperation (OEEC), covers all of 1956 and half of '57. It pegs total '56 investment at $900 million in western Europe's eight chief chemical-producing countries — Belgium, France, Germany, Italy, Luxemburg, Norway, Sweden and the U.K. This compares with $840 million in '55.

During the first six months of '57, production climbed 13%, compared with output for the first half of '56. For all of '56, it was 8% higher than '55's total.

Investment Riding High: The boost in productivity shows up, says OEEC, when the 8% production gain in '56 is compared with an increase of only 4% in work force for the year. And OEEC believes investment in the European chemical industry will stay at record highs, at least for the near future, which will bring a continued rise in output/man-hour ratios.

These general increases will benefit almost all parts of the industry. But the biggest payoffs are expected in petrochemicals, other organics, plastics, some inorganics and fertilizers. These commodities accounted for most new investments during 1956-57.

Exports Still Ahead: Chemical imports of OEEC member countries rose 11% in '56 to almost $2 billion. Of this, $384 million came from the dollar area—an increase of 10% over the previous year. Exports in '56 totaled nearly $3 billion, 10% more than in '55. Exports to the dollar area were 17% higher than in '55, amounted to almost $300 million.

But mingled with all the optimism is growing concern over slimming ranks of skilled manpower. While the scramble for trained people affects all industry in Europe, it's particularly serious among chemical producers, says OEEC, because of the industry's above-average expansion and its rapid advances in technology. Determined to do something about it, OEEC has set up a committee to study the manpower problem and draw up a program to help member countries.

TGT President Elmer shows way to higher rates on natural gas.

Gas Cost Crossroads

Manufacturing costs for many chemicals based on large-scale use of natural gas as fuel or feedstock are teetering in the balance this week because of current events in Washington:

- Congressmen are being polled on a bill to end federal regulation of prices charged by independent producers who sell gas to interstate pipeline companies. If the bill is passed by the House this month, Senate passage later this session is likely.
- On the other hand, the U.S. Supreme Court appears to have strengthened the present policy of federal regulation of such prices. It has ruled that a state cannot set the wellhead rates, even if (1) the purpose of the state's order is to promote conservation, and (2) the order establishes prices before production, not at the actual point of sale to a pipeline concern.
- In its first approval of higher gas rates since the "Memphis decision," last Nov. 21, the Federal Power Commission has o.k.'d a new rate schedule that's expected to boost Texas Gas Transmission Corp. revenues by nearly $10.2 million/year.

Customer Clearance Required: FPC's action on TGT's 1957 application makes it clear that pipeline companies will stand a good chance of getting higher rates approved, provided that they go through all the preliminary negotiations required by the Memphis decision.

In that decision, the U.S. Court of Appeals at Washington specified that an interstate pipeline company, before applying for higher rates, must first get all its direct-sale customers to agree to the proposed rates.

TGT President W. M. Elmer says his company was fortunate in having reached "an advanced stage of negotiations with our customers" at the time of the Memphis decision.

Others in the industry are continuing to attack the federal regulation policy through court cases. But last week's Supreme Court ruling seems to show that this policy is more vulnerable to legislation than to litigation.

Bullish on Drugs

Though bearish on various other industries, Wall Street is expecting great things of U.S. drug and pharmaceutical companies this year.

Drug industry specialists from New York's financial community* made these points last week before the New York Society of Security Analysts:

- Aside from a few knocks in the public relations sector, this should be a good year for the industry, with major publicly owned companies expecting sales to increase by an average of 8-9% over '57 levels.
- Though profit margins probably will be under greater pressure because of rising operating costs, industry earnings should increase at least 5%—or even more if there's another epidemic comparable to last year's outbreak of Asian flu.
- Pharmaceutical company stocks will be better evaluated, particularly as "excellent mediums for appreciation"; and there'll be a reversal of the "unwarranted" 1956-57 trend toward lower price-earnings ratios.
- As to prospects for developing new products, new mental drugs look like the best bets for '58; therapeutic agents for cardiovascular disorders and virus diseases are farther off; chemotherapy for cancer is "not at hand."
- Industry management has "learned its lesson" from previous "periods of disorderly price cutting"; but some smaller companies have trimmed prices on certain hormone products, and larger firms may follow suit before summer.

*Stephen Becker, Lionel D. Edie & Co.; Paul Marks, Harris, Upham & Co.; Russell Morrison, Standard & Poor's Corp.

EXPANSION

Paper: Kimberly-Clark Corp. of Canada is launching a new expansion program by opening a paper converting plant at St. Hyacinthe, Que. K-C will produce a variety of paper napkins in a rented plant (starting the end of February), will move into its own 60,000-sq.-ft. plant there upon completion early next year. The firm expects the new operation will match output of its Niagara Falls, Ont., plant within seven years.

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Plastics: American Cyanamid has started building a product development laboratory and pilot plant for its Plastics & Resins Division at Wallingford, Conn.

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Fine Organics: Cardinal Mfg. Co. (Columbia, S.C.) —custom manufacturer of fine-organic chemicals—has closed on purchase of a 10-acre tract in the Bushy Park industrial development at Charleston, S. C. (*CW, June 29, '57, p. 21*). It has also taken an option on an additional 20 acres there.

•

DMT: Du Pont last week decided to go ahead with the dimethyl terephthalate project at Old Hickory, Tenn., which has been the subject of engineering studies since last summer (*CW, Jan 25, p. 32*). It will be Du Pont's second DMT unit, will be completed in '59. The company points out that this compound is the basic ingredient for three Du Pont tradename products: Dacron polyester fiber, Mylar polyester film, and Cronar polyester photographic film base.

The company has not yet decided on the Dacron project, also proposed for the Old Hickory location.

COMPANIES

Warner-Lambert Pharmaceutical Co. has capped a series of mergers by consolidating all marketing operations under the new Family Products Division. The firm grew out of the merger of Warner-Hudnut and Lambert Pharmacal in '55. It later added Emerson Drug Co. and Nepera Chemical Co.

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Diversey Corp. (Chicago) has acquired Wilson Chemical Co. (Honolulu), will operate it as a division for blending and compounding agricultural chemicals. Diversey specializes in disinfectants, insecticides and other compounds for the metal and food processing and food service fields.

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Victor Equipment Co. (San Francisco) has acquired (effective Feb. 3) a group of six gas-producing companies for $2.1 million. The firms, owned by the Coyne family (San Francisco), produce compressed acetylene, liquid and compressed oxygen, hydrogen, nitrogen and argon. Victor will issue and exchange 71,000 shares of its common stock for the companies: California Oxygen Co.; California Liquid Oxygen; California Medical Gases Co. (all of Sacramento); Welding Gases (Salinas); California Oxygen Co. (La Habra); and California Oxygen Co. (San Diego).

•

Rayonier Inc. (New York) has cut its first-quarter dividend from 35 to 20¢/share. In its preliminary annual report, the cellulose producer listed fourth-quarter earnings as $1.3 million, down from the $2.8 million of fourth-quarter '56. Sales slipped from $137.8 million in '56 to $117.5 in '57. And net income (after taxes) was down from $13.9 million to $6.2 million. Per-share earnings dropped from 55¢ in '56 to 23¢ in '57. Cellulose sales fell off about 40,000 tons, wood pulp sales 75,000 tons.

Last year, Rayonier spent $29 million in capital investments, including new mills in Jesup, Ga., and Port Alice, B.C. Investment plans for '58: $7 million.

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Reynolds Metals Co. took the first step toward expansion of its 112,500-tons/year aluminum reduction plant when it tapped the first of three new potlines at Listerhill (Sheffield, Ala.). When the other two start up (early spring and summer), Listerhill capacity will total 190,000 tons/year. Aluminum from the new plants will be used in an adjacent Ford Motor Co. foundry and by Reynolds.

FOREIGN

Acrylic Yarn/England: Courtaulds Ltd. will build a plant at Grimsby for production of England's first acrylic fiber, Courtelle. "Medium scale" production of this is already under way at Courtaulds' viscose rayon plant at Coventry. Two types are being produced: a standard type, with 1% shrinkage in boiling water, and one with 15-17% shrinkage. They are blended for high-bulk yarn. Provisional price: $1.27/lb.

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Chemicals/Argentina: Farbwerke Hoechst A.G. (Frankfort) is the first German firm to return to Argentina following return of trademarks and auction of confiscated "enemy property" (*CW, Dec. 28, '57, p. 27*). The company has founded an Argentine firm, Quimica-Hoechst S.A., to produce polyvinyl acetates and its emulsions for the paint, adhesives and textile industries. The new plant is scheduled to start up by mid-'58. Part of the capital comes from Compania Quimica S.A., an Argentine firm largely under German ownership.

Celulosa Argentina S.A. opened a new 15-tons-a-day paper plant at Belle Ville (Buenos Aires province). The plant is one step in a $13.3-million expansion, partly financed by a $6.5-million Export-Import Bank loan. Products include coated packing paper and finished cement and salt bags.

•

Construction/Japan: Foster Wheeler Corp. (New York) and Ishikawajima Heavy Industries Co., Ltd. (Tokyo), have formed the Ishikawajima Foster Wheeler Co. Ltd., to design, build, and sell chemical and petroleum processing plants.

PETROCHEMICALS

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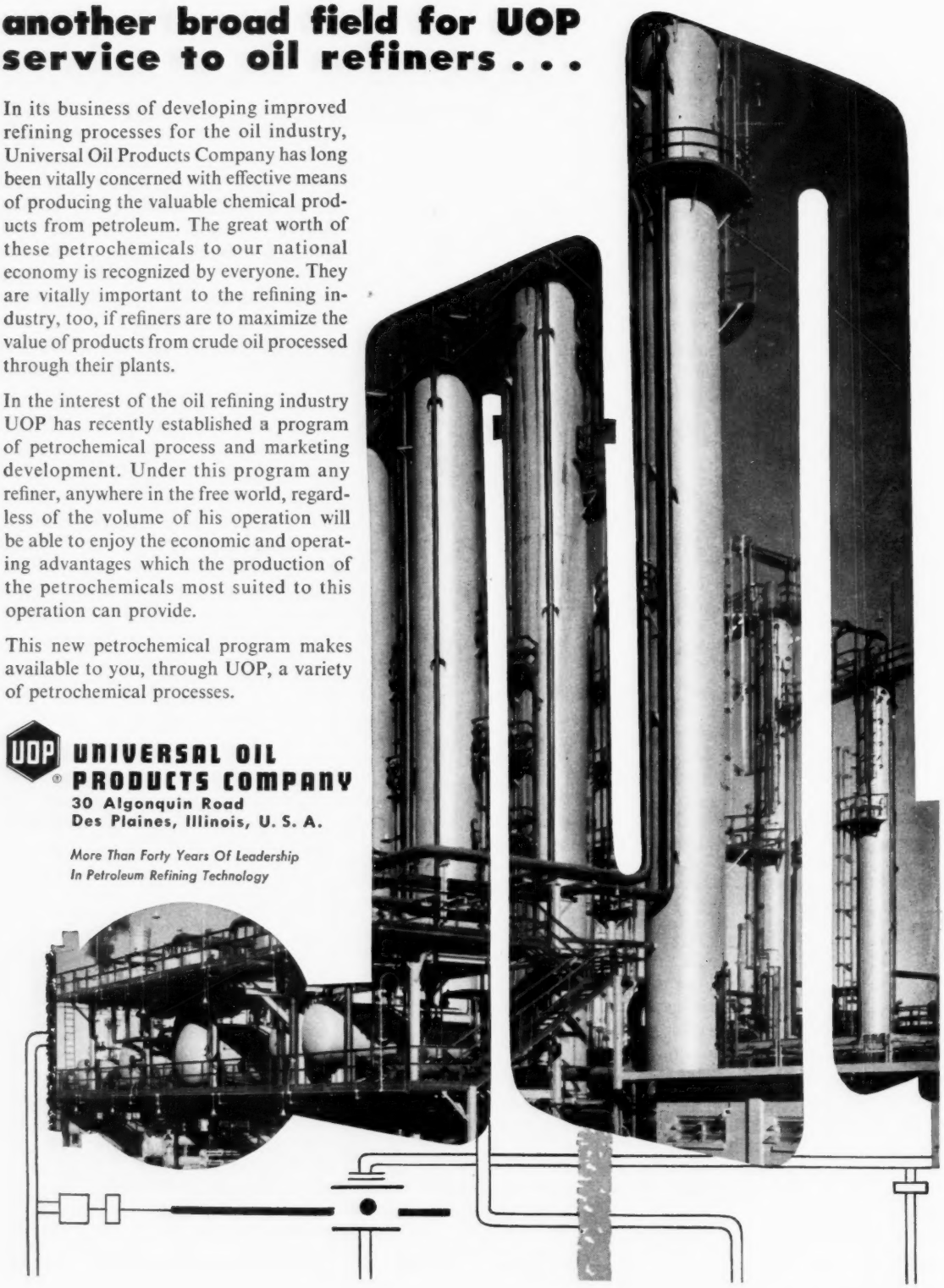

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Washington
Newsletter

CHEMICAL WEEK
February 1, 1958

Democrats in Congress are mounting an all-out attack on Administration plans for countering the recession. This week's hearings of Congressional Joint Economic Committee are setting the stage.

The heavy shooting is expected next week. Top government administrators will be called in to defend the Administration's claim that an upturn will come about midyear. Leadoff witness will be Percival F. Brundage, budget director, who will tell about the Administration's stepped-up spending programs. Democrats will say the increase is not enough to help much. W. J. McNeil, Defense Dept. comptroller, will be next, followed by Treasury Secy. Robert B. Anderson and Federal Reserve Chairman William McC. Martin, Jr.

Democrats have no big antirecession program of their own to push right now. Purpose of the hearings is to prepare the way for action later if business does not turn up. One possibility: Democratic sponsorship of a tax cut, following a round of economic hearings in May or June.

•

You can also watch for fireworks from the Democrats who have been combing through last week's report on areas of substantial labor surplus. This is the kind of recession data that really hurts the politicos—Republican or Democrat. The number of cities moving into the labor surplus classification—now 45—is almost double the number (24) of November, when the last count was made.

The Labor Dept. is putting out the bad news, says that chemical companies are among those expecting an employment pickup by mid-March.

On the other hand, the department notes that professional workers of all kinds—including engineers and technicians—are finding demand for their services "particularly less urgent" than even two months ago.

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Watch for a new Congressional fight over oil producers' demands for government regulation of oil imports. All in all, the importing companies have been holding down their crude imports to the level that Eisenhower asked of them under a voluntary program. However, the politically vociferous independent Petroleum Assn. of America—speaking for the producers—promises to seek legislation imposing monetary penalties on "excessive imports" of crude or products.

This will complicate the Administration's hopes for its reciprocal trade legislation, which is already heading into tough sledding.

•

A move to correct the tax code inequities and hardships got a major boost this week when the House passed the "technical tax bill of 1957" (HR 8381).

Washington Newsletter

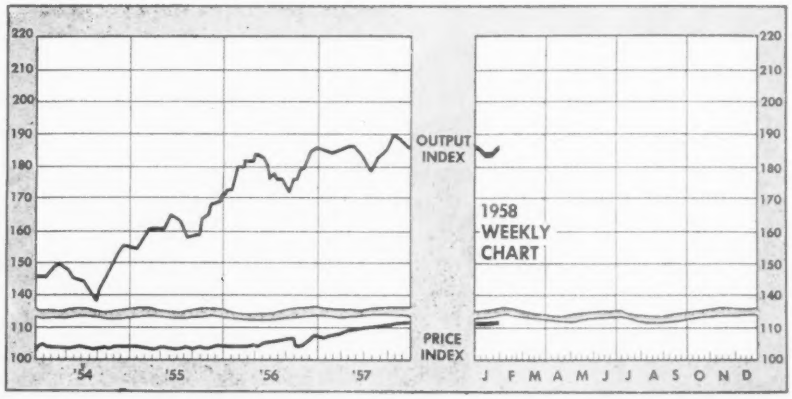
(Continued)

Legislators hailed the bill, containing 81 sections, as a major step in eliminating substantial unintended benefits and hardships in existing income, estate and gift tax provisions.

Typical of the unintended benefits that the bill would remove: the conversion of ordinary income into capital gain income by purchasing bonds with coupons detached; advantages derived by part-time employees of exempt organizations from deferring tax on their salaries by taking it in the form of annuity contracts; special benefits derived by holding various types of stock for only short periods of time around dividend dates; the special advantages from writing bond premiums off over relatively short periods where the bonds have early call dates.

•

The Supreme Court has ruled against making it easier for businessmen to sue competitors for triple damages on price discrimination charges. In cases brought against Carnation Co. and Safeway Stores, the court found that competitors can't use Section 3 of the Robinson-Patman Act —banning sales "at unreasonably low prices for the purpose of destroying competition or eliminating a competitor"—to support triple damages. Charges of price discrimination under the Clayton Act—put there by other sections of the Robinson-Patman Act—can be used for triple-damage purposes, the court found. But technically, Section 3 isn't part of what's legally meant by "the antitrust laws." Since it isn't, it can't be used in a triple-damage case.



Business Indicators

WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	185.5	186.0	187.1
Chemical Week wholesale price index (1947=100)	111.1	111.2	108.3
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	40.39	40.51	42.15

MONTHLY (Production Index 1947-49=100)	Latest Month	Preceding Month	Year Ago
All manufacturing and mining	134	141	144
All chemical products	185	188	181
Industrial chemicals	204	207	199

WANT
BALANCE?
USE

FLEXOL Plasticizer DOP

TRADE-MARK

FLEXOL plasticizer DOP—CARBIDE's brand of di(2-ethylhexyl phthalate)—is the *standard*. It's the most widely used plasticizer in the vinyl plastic industry today. Why? Because FLEXOL DOP has balance.

DOP represents an outstanding balance of compatibility, low volatility, low temperature flexibility, and remarkable heat and light stability. The fine balance of these and other performance properties plus DOP's economy make it the all-around plasticizer for

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- cast vinyls
- molded vinyls
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- plastisol-fabricated vinyls

The rigid specifications of FLEXOL DOP assure you of superior quality with every shipment.

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- FLEXOL 10-10, *didecyl phthalate*, for permanence
- FLEXOL 426, *butyl-octyl phthalate*, for performance *plus* economy
- FLEXOL R-2H, *a polyester*, for low volatility and extraction resistance
- FLEXOL 380, *a monomeric phthalate*, for lacquer mar resistance

CARBIDE's wide selection of plasticizers also means you can take advantage of the savings due to combination tank car, tank truck, and car loads. CARBIDE's basic raw materials position and many shipping points guarantees you quick delivery of FLEXOL plasticizers and the quality and quantity you need.

For more information on DOP and other FLEXOL plasticizers—write Union Carbide Chemicals Company, Department B, 30 East 42nd Street, New York 17, N. Y. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Toronto.

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UNION CARBIDE

CHEMICALS

Union Carbide Chemicals Company
Division of Union Carbide Corporation
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Sales trainee Fred Poerschke learns what it's like to interview a salesman.

90 Days Behind the Buyer's Desk:

Training in purchasing for prospective chemical salesmen is being increased 4,500-6,000% in a novel move at Monsanto's Organic Chemicals Division. Breaking sharply with the industry's conventional training stint of 1½ to 2 days, Monsanto now has its future salesmen spending a full 90 days in purchasing operations doing a great deal of actual buying.

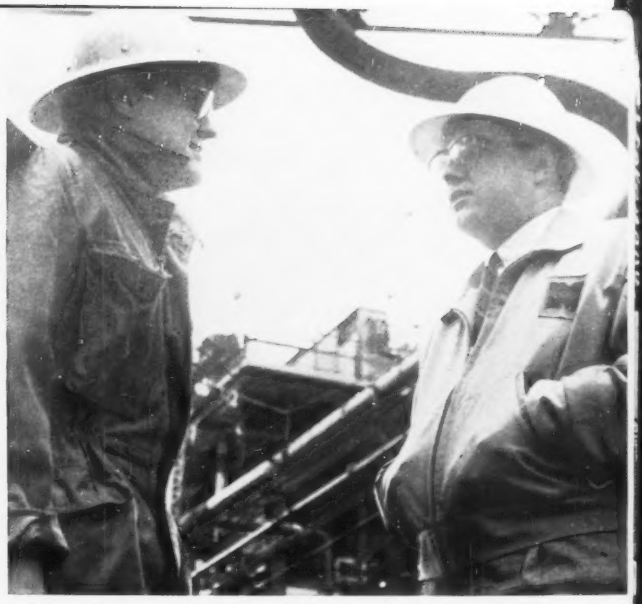
This week, *CW* looks at the plan, which has its first "graduates" bubbling with enthusiasm. Old-timer or new trainee, salesmen who have been through the course are convinced it has improved their personal selling efficiency.

Sales staffs have long recognized the need for purchasing knowledge as a route to better sales relations (*CW, Feb. 23, '57, p. 90*). And the sharp increase in scientific buying (value analysis, purchasing research, etc.) has steadily furthered the salesman's need for purchasing education.

Monsanto's program, worked out by Sales Director Tully Tupper and Purchasing and Traffic Director Howard Hefferman, aims at four broad goals:

• Making a professional salesman rather than a "drum beater." During the purchasing stints, the trainee sees more sales techniques in operation than he ever

Surplus disposal is part of trainee's busy day.



Selling idea to plant engineer isn't always easy.

Purchasing specialist helps with tough decision.

Plant purchasing agents check a day's results.

New Slant in Making a Salesman

could by traveling with the district sales manager.

- Providing first-hand experience in the problems, responsibilities and pressures faced by purchasing men.
- Acquainting trainees with the company's products, plant operations and production personnel.
- Adjusting prospective salesmen to the business world. Says Tupper: "It gets the 'Joe College' out of a trainee quickly."

On the Job: The program begins with two days in Monsanto's central purchasing and traffic department at St. Louis. There, the trainee studies the firm's purchasing manual and hears lectures on basic company policy and on purchasing department procedures.

Next, he is assigned to the nearby Queeny or Krummrich plants. Significantly, he works as a purchasing trainee—or as an assistant buyer—not as a sales trainee.

At the plant, the trainee purchases raw materials and mechanical items, places local and out-of-town orders, expedites and releases shipments against orders. He interviews sales representatives, seeks new supply sources, obtains competitive bids, advises on economical procedure and disposes of surplus (salvage).

Special projects for the purchasing staff are important facets of the education. One salesman-in-training de-

veloped a system for procuring plant tools on an annual contract basis, with selection governed by standardized quality specifications instead of by tradenames. Results: more economical purchasing, reduction of the number of suppliers from 75 to 15.

Better Salesmen: Translating the program's values into actual selling is left to the man taking the course. Hence, the benefits vary somewhat.

Here's what one 9-year veteran salesman (George Stewart) reports; he took the course to see if it benefited the experienced sales representative:

In his 90-day stay at St. Louis, Stewart visited suppliers' plants and facilities, studied Monsanto purchasing and production operations. But most importantly, he interviewed about 150 salesmen, purchased more than $100,000 worth of mechanical items, motors and gear. He estimates that "about 25% of the salesmen interviewed didn't know their product, another 50% didn't know how to put their product across. Only about 25% had something worthwhile for Monsanto and presented it accordingly."

Stewart's experience quickly showed four cardinal rules for the trainee who hopes to become a "star salesman."

- Prepare sales presentation in advance. This forces a salesman to know his products and to discover the best means of presentation.
- Make appointments. The training reveals the tremendous time pressure and "busyness" encountered by purchasing agents. Appointments assure an interview, make the buyer feel his time and work is respected and give him a chance to develop an answer to the sales proposition.
- Use visual aids and demonstrations. Literature and catalogs make it much easier for the buyer to visualize the product, understand the proposition and reach a conclusion.
- Give the purchasing agent a tangible or written form of the presentation to help him sell the product to others (e.g., plant engineers). (Stewart says many callers failed to leave even a calling card.) And Stewart was surprised at the huge "selling job" buyers face in proposing a salesman's idea to operating personnel. Now back on the road, he is furnishing buyers with a letter recapping the presentation.

Saving Money: Three months at the purchasing agent's desk also reveals the profit-making potential of purchasing. In some cases, a dollar saved in purchasing equals the profit from $10 in sales. Consequently, a cost-cutting sales approach will get thorough attention from a buyer.

Other trainees share Stewart's appraisal of the program. Ted Averill, for example, stresses his insight into the "busyness" of the purchasing agent. "He's so busy that conversation about inconsequential matters will do him and his company more harm than good."

Extra Premium: Besides the gain in staff selling ability, Monsanto is realizing several incidental benefits. Among them:

- Reduced workload on regular purchasing personnel, freeing them for special projects.
- Better coordination between sales and purchasing.
- Salesmen's broadened knowledge of company products.

Background: Preceding the purchasing stint is a basic, 12-week orientation program. A six-month period as a sales trainee or assistant sales representative follows the purchasing tour of duty. In the first month in purchasing, the firm estimates, the trainees "just earn their keep." In the last two months, they usually reach a high degree of skill, "become a valuable addition to the purchasing staff."

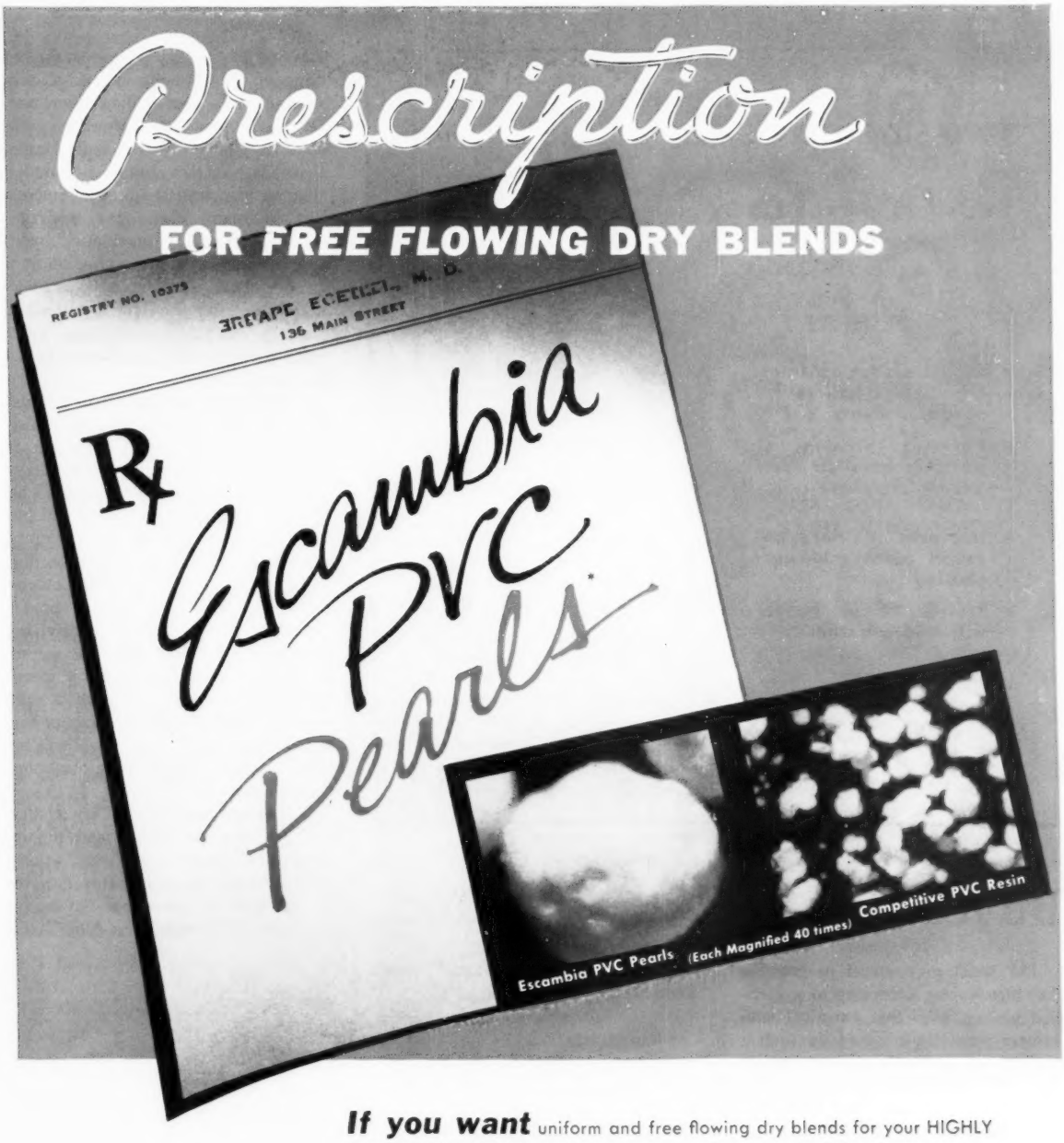
Five men have successfully completed the program to date; another is now taking the course.

Meanwhile, other company divisions are watching with "deep interest." And for good reason: teaching how to cater to the ever-busy buyer shows every sign of upping sales efficiency.

After-hours study of purchasing textbooks rounds out do-it-yourself experience.

Prescription

FOR FREE FLOWING DRY BLENDS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TWO SIDES TO CONTRACT PROGRAMING

Switch to purchasing-by-plan gives buyers . . .

BENEFITS

- Firm basis for contracting with suppliers for future delivery
- Rational division of business between competing suppliers
- Improves relations between plant and purchasing staffs
- Provides local buyers with more authority

OBLIGATIONS

- Firm commitments to carry out contracts with suppliers
- Recognize differences in quality, delivery, price and service
- Must try to improve relations between purchasing and suppliers
- Prevent authority from being misused

Buyer Has Obligations Too

The trend to contract programing (advance buying according to a specified plan) proves that chemical consumers generally are sold on such a policy. But many have yet to recognize their obligations under the system. Last week in Chicago, Fred Schmitt—Merck's chief of chemical division purchasing—spelled out the importance of customer obligations inherent in purchase programing.

Before an audience of 125 purchasing executives, assembled for the annual midwinter meeting of the Chemical Buyers' Group,* Schmitt explained both advantages and obligations.

Contract scheduling, Schmitt believes, offers a company many advantages. In his own experience, the concept enabled '57 buying plans to be firmed up before the end of '56. That permitted buyers to negotiate with suppliers on the basis of known requirements.

As a result, Merck's Chemical Division completed, in 1957, "twice as many cost improvement projects with twice as much dollar advantage" as in '56. Moreover, relations between purchasing and other company departments reached a level of "mutual satisfaction." Complaints, controversy and strain were largely eliminated. And by the same coin, he said, it helped reduce tensions between buyers and suppliers.

Realization of the gains from contract purchasing. Schmitt noted, gives an organization "time to look around." That tends to increase the buyer's knowledge of his responsibilities to suppliers. Some examples:

• **Commitment Performance:** Occasionally, a company fails to purchase all the material originally specified in the contract. Understandably, the question of fairness pops up—that of tying up a supplier's inventory, preventing him from selling elsewhere. Deviation from the contract commitment may be justified in special cases—strikes, vacation shutdowns, sudden changes in raw material requirements. But in many cases, the deviation stems from an "overzealous buyer" acting under pressure and without a clear policy. The remedy, Schmitt suggested, may be establishment of special criteria for emergencies, more detailed delegation of responsibility and authority.

• **Price Buying:** Schmitt urged the chemical buyers, when awarding business, to take account of the value of reliable market information. Producers who follow a "single price policy" he noted, tend to be "ready and reliable sources of market information."

• **Quality Consciousness:** Over the years, product quality generally creeps upward. Purchasing agents should avoid shrugging off extra quality, instead refer the new specifications to the plant chemist. Schmitt asked meeting attendees to weigh the effect that casual dismissal of product quality has on salesmen and to ask, "How will he and his company react when our company needs help?"

• **Delivery Evaluation:** Easy availability of most chemicals and highly competitive conditions focus attention on the late shipment. Buyers have an obligation to remember the many shipments that were "on time"—as

Merck's Schmitt: Chemical buyers need to evaluate supplier aid.

*Affiliated with the National Assn. of Purchasing Agents.

well as remembering the late arrivals.

• **Sample Order Processing:** Casual requests for costly research samples sometimes produce explosions of ill-will in supplier organizations. Frequently, the purchasing agent is unaware of the problems sample requests pose for producers. Schmitt is convinced that buyers must recognize their strong obligation to discover such situations, understand the supplier's position.

• **Special Services:** Materials-handling advice, freight assistance, marketing information and patent data are commonly available from most manufacturers. Nonetheless, it's all too easy to "dismiss such services as trade practice," said Schmitt. "The way a company understands and recognizes services has much to do with the service that it receives. Each buyer . . . has a larger responsibility than just purchase orders. Are we able to recognize these special services to the satisfaction of our suppliers and their representatives?"

To be sure, contract programing is no cure-all for all the problems that arise between vendor and buyer. But Schmitt strongly believes the method goes a long way toward giving a buyer ample opportunity to find and meet everyday obligations to suppliers, and that it's a step toward higher profits for both customer and supplier.

DATA DIGEST

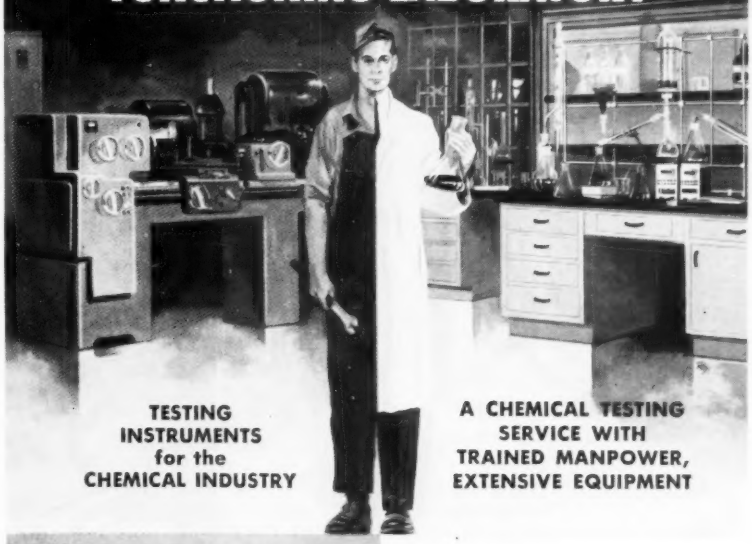
• **Sesoxane:** Series of bulletins (1001, 1002, 1003) describe physical properties, toxicology and uses as a synergist for pyrethrins and methoxychlor. Shulton, Inc. Fine Chemicals Division (New York).

• **Silicones:** 12-page brochure discusses silicones as dielectric materials. Applications are described in electric-motor insulation, electronic control systems, surface coatings, wire coverings and encapsulating compounds. Dow Corning Corp. (Midland, Mich.).

• **Gravure inks:** Multicolor printing of vinyl film, sheeting and fabrics are considered from viewpoint of lightfastness, soapfastness and other properties. Claremont Pigment Dispersion Corp. (Roslyn Heights, N.Y.).

• **Amine film:** Use of filming-type amines for corrosion control in steam condensate systems is discussed in 4-page folder. Hagan Chemicals & Control, Inc. (Pittsburgh).

SCIENTIFIC TESTING INSTRUMENTS MADE BY A FUNCTIONING LABORATORY



TESTING INSTRUMENTS for the CHEMICAL INDUSTRY

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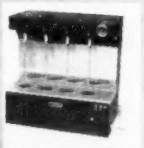
We Make Them More Efficient Because We *Use* Them, Too!

As the only functioning laboratory manufacturing instruments, we harness the talents of the laboratory and the instrument technicians. Result: the instruments are conventional in operation, simple to calibrate, easy to maintain. They are sensitive, stable, and, in most cases, applicable to multi-purpose testing requirements. And all are pre-tested in our own laboratories.

Our instrument service is four-fold: we design and manufacture new instruments; we modify existing instruments to meet special needs; we manufacture instruments from existing designs; we operate new instruments where impartial laboratory reports are essential. Write for our free Instrument Service Bulletins.



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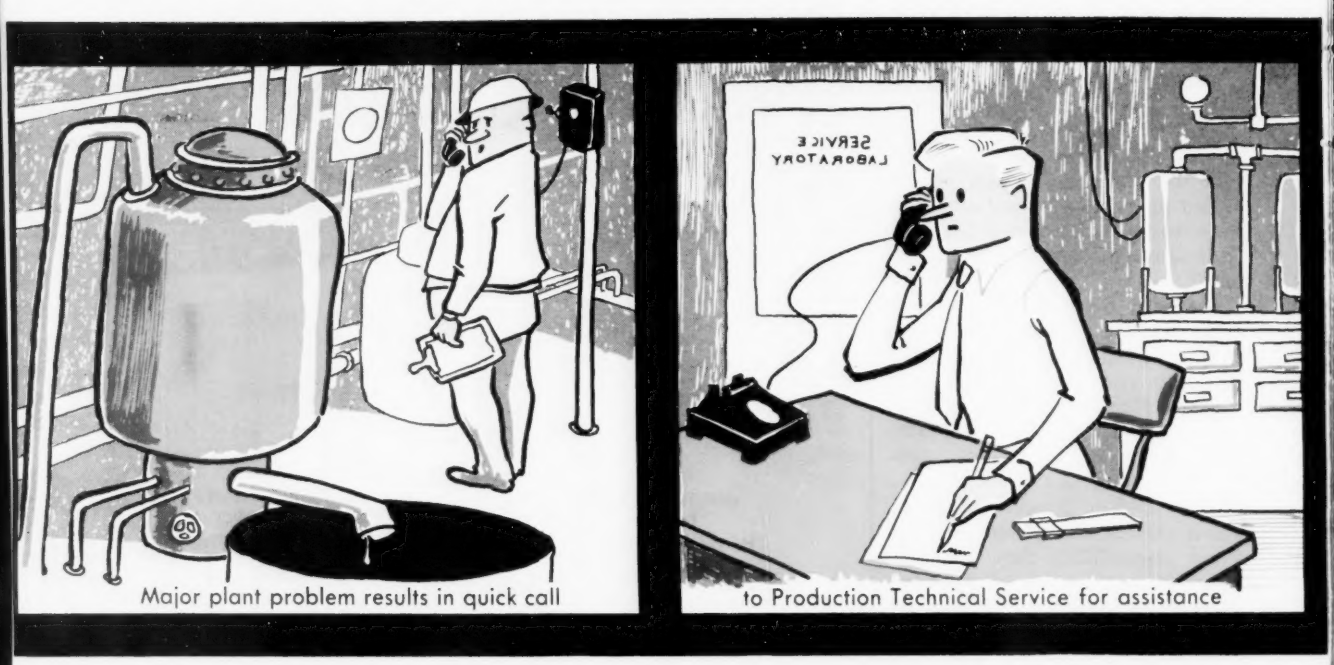


Multiprocess Specialists: Problem-

Virtually every major chemical plant has a squad of problem-solving specialists, who handle crises arising from balky equipment or chemical reactions. But few plants have a more paradoxical group of specialists than Dow Chemical's Western Division plant at Pittsburg, Calif. Dow's specialists—specialists in many plant skills—are well worth the attention this week of increasingly cost-conscious production management.

The specialists—members of the production technical service department—seem to belie the term. Each is a jack of several trades, seems to buck industry's general trend toward specialization. And since its birth several years ago, the group's size and its scope of activities have grown continually.

Reason: the group has shown its ability to help the plant keep up with the growing complexity of process technology and, at the same time, free researchers from time-consuming plant trouble-shooting.

Split from Research: The production technical service group originated in the research department. A group of researchers, including R. D. (Barney) Barnard, who currently heads the service group, had been working on chlorination problems for several years. But the scope of the project continually widened and the group found it was spending more and more time in the plant.

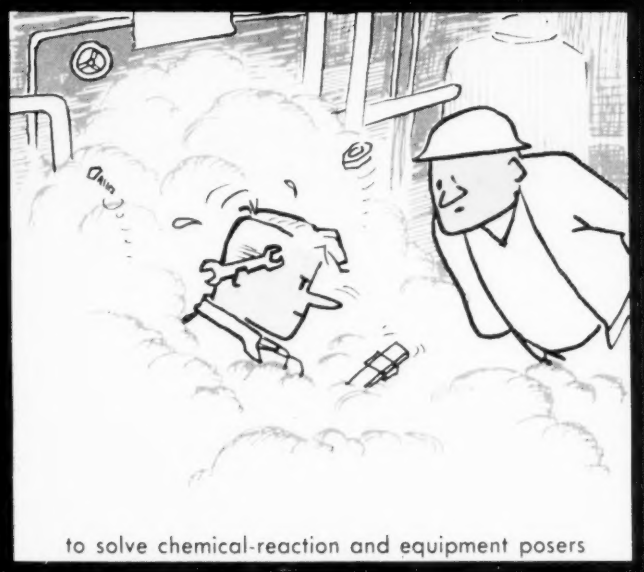
Dow's Western Division management, realizing that the chlorination group's into-the-plant movement was becoming typical of other research groups, decided to set up a special service group to reverse the trend. It established a production technical service group as a part of the plant production department, answering directly to the production manager.

The new group's responsibilities:

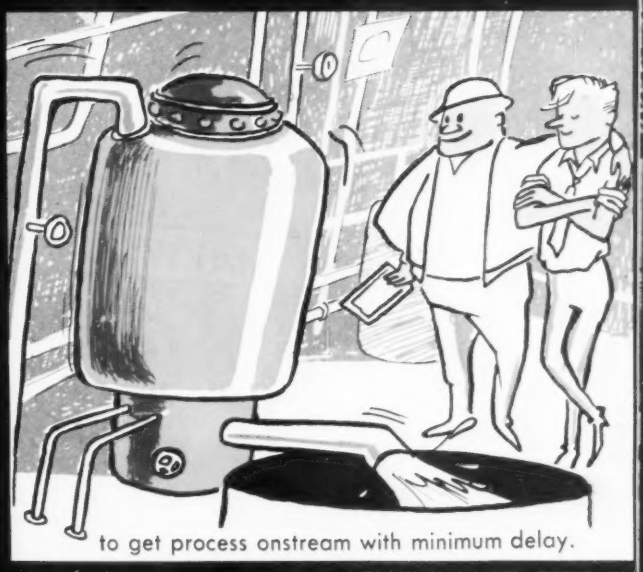
- To assist the plant superintendents in keeping all Western Division units "up," technically, and operating at lowest possible cost. This phase of the activity includes plant trouble-shooting.
- To be certain that new processes are as free as possible from operating bugs before they are engineered. This may even mean setting up and operating a small glass pilot plant.
- To provide round-the-clock assistance for start-ups, including detailed startup instructions. By performing this function, the production department has a ready-made nucleus that has been through the rigors of putting a new plant onstream.

Operations Knowledge: Prime requisite for the production technical service engineer is a complete knowledge of Dow's operating plants. "It's difficult to understand what is wrong with a process, much less cure it, if you don't know a process intimately," says Barnard.

Dow's operations at Pittsburg break down into nine production categories: methionine, xanthate, chlorination, electrolytic cells (including brine), caustic evaporation, ammonia, aluminum trichloride, ferric trichloride and latex (the newest operation).



to solve chemical-reaction and equipment posers



to get process onstream with minimum delay.

Solvers for Plant Technical Posers

Naturally, no one engineer can be a specialist in all nine fields. But since the group's engineering complement is only six (as many as 10 hourly employees have been used as experimental operators), each engineer must be well versed in several categories. And overlapping of skills is encouraged. Having several experts in each category is insurance that at least one will be available for emergencies or during vacation periods.

Were the individual process units rated in the "giant" category of Dow's Midland or Texas divisions, experts in a single category might be justified, says Barnard.

But under the present setup each chemical engineer is rated in the expert class in about three categories and is highly rated on his knowledge of two other categories.

"Each of our engineers has been with our firm for several years, has picked up special skills and experience in the plant. This enables him to do a good job of trouble-shooting, provides a basis for helping make process improvements," says Barnard.

Keeping Up: But the knowledge gained in the plant can't help the group through all problems. The individual members must keep up with latest developments reported in the literature and at technical meetings. Men are selected for this ability to keep up with their "schooling": two members of the group have Ph.D's, a third member has more schooling than either Ph.D.

Even so, a plant sometimes fails, and correction of the failure is too complex for any member of the group to handle. The group then calls on the research department for assistance. But with the engineer's intimate knowledge of the plant, he is able to act as an intelligent liaison man between production and research, help solve the problem quickly.

Assistance also comes from the plant. For example, the superintendent of the latex plant was sent to Midland to learn process technology. He has transmitted his knowledge to the group. But as the expert in the field, his cooperation in problem solving is vital.

At Home: In addition to his other abilities, each member of the group is picked for his ability to work with others. "The interests, vocabularies and general knowledge of research and production people are becoming ever more separated as research and production, of necessity, become more specialized," says Barnard.

The production technical service man's plant and research experience help put him at home with both groups. And this ability to be at home helps get the cooperation the group needs. As Barnard points out, the group's function is to help production departments. For the group to carry out its assignment, it requires as much help as possible from others. "We try our best to do a good job, but no matter how well we think we are doing, we have no reason to boast. We can always improve on all phases of our assignment—solving chemical problems, solving equipment problems and obtaining help and cooperation from everyone we deal with."

LITHIUM METAL AND ALLOYS
LITHIUM HYDRIDE
LITHIUM HYDROXIDE
LITHIUM CARBONATE
LITHIUM CHLORIDE—BRINE—etc.

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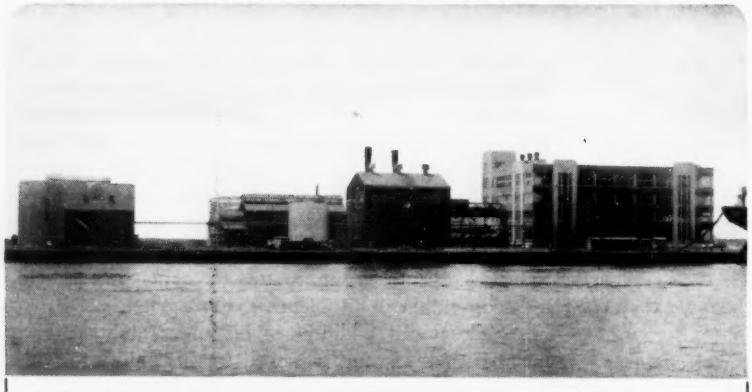
MAYWOOD

Pioneers in Lithium since 1901

MAYWOOD CHEMICAL WORKS
MAYWOOD, NEW JERSEY
ESTABLISHED 1895



Swift & Company, Port Newark, N. J. Plant comprises a vegetable oil refinery, with tank yard, pumping station, hydrogen plant, boiler house, an experimental bakery and food testing laboratory.

An experienced corps of consultants and designers to work with you for a low cost competitive plant or enlargement.

LOCKWOOD GREENE
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New York 17, N.Y. 41 East 42nd Street
Spartanburg, S. C. Montgomery Bldg.

OVER A CENTURY OF INDUSTRIAL PLANT DESIGN EXPERIENCE

PRODUCTION EQUIPMENT

Fail-Safe Diaphragm Pump: T. Shriver & Co., Inc. (Harrison, N.J.), now offers a new Type SP duplex diaphragm pump with improved performance, longer operating life, protection against damage through diaphragm failure. Liquid ends can be removed in a few minutes for full inspection, cleaning, or sterilizing. Diaphragm-support piston mechanism is an integral unit, can be removed without disturbing piping. If diaphragm fails, slurry blow-off and free space behind the diaphragm prevent slurry from getting into drive mechanism, and blow-off vent gives warning of failure. Maximum discharge pressure: 100 psig.; rated capacity: 20 gal./minute.

•

Plastic Air Scrubber: Line-O-Coat Co. (Compton, Calif.) is manufacturing a new lightweight, corrosion-resistant fume washer made of glass fiber-reinforced polyester. As fumes swirl through scrubber, solids and contaminates are spray-washed into water reservoir. Doors in lower section provide access to reservoir for cleaning; doors in upper section provide access to spray nozzles. Unit weighs about one-third as much as a steel unit. Automatic water-recirculating system is available as an accessory.

•

Cartridge Heater: Hotwatt, Inc. (Danvers, Mass.) recently added a ¼-in. diameter cartridge heating unit—described as the smallest standard unit now available—to its line of cartridge heaters for localized, closely controlled heating of process equipment. The moisture-resistant unit generates a maximum surface temperature of 1250 F. The cartridge, in a stainless-steel sheath, is available in lengths of 1 in. and longer.

•

Extreme-Pressure Gauge: A newly designed pressure gauge which allows pressure estimates to within 250 psi. for pressures up to 100,000 psi. is a new offering of American Instrument Co., Inc. (Silver Spring, Md.). Instrument dial can be read accurately to each scale division (1,000 psi.). Gauge has heavy-walled chrome-nickel molybdenum eccentric tube surrounded by heavy-walled cast-iron case with sheet-metal safety back to absorb energy from accidental overload to

Worthite filter feed pump at Farmers Chemical Company, Joplin, Mo. Worthite is a Worthington Corporation trademark for their corrosion-resisting, nickel-containing alloy. Composition: 24% Ni, 20% Cr, 3.25% Si, 3% Mo, and 1.75% Cu.

Made of nickel-containing stainless steel...

Long-lasting parts in this pump take phosphate-gypsum slurry in easy stride

In a plant producing high analysis phosphate fertilizer, this Worthington Corporation filter feed pump does a bang-up job with hard-to-handle gypsum slurry.

And that's understandable—because impeller and impeller casing, shaft and suction head are all made of Worthite, a cast Ni-Cr-Mo austenitic stainless steel containing 24% nickel.

The pump pictured here, for example, handles slurry with a dilution of 1.4 parts of solution to 1 part of solids. Solution is 32% P_2O_5 with dissolved calcium sulphate, 1% free H_2SO_4, up to 3% hydrofluosilicic acid and fluosilicates and traces of hydrofluoric. Solids are primarily 100-400 mesh gypsum with about 5% 60-100 mesh unattached phosphate particles, mostly silica. Temperature: 158°F. Specific gravity: 1.66. Flow: 480 gpm.

In this service, impeller, shaft and suction head have an average life of 26 months, the impeller casing 31 months. Under slightly less severe conditions in the same plant, other Worthite pumps have had no replacement of parts in three years of continuous use.

Perhaps a cast or wrought stainless steel containing nickel can help *you* combat corrosion and abrasion, or meet some other specific need. For information to guide you in selecting the right alloy, get in touch with Inco's Development and Research Division. They're always glad to be of service to metal users.

THE INTERNATIONAL NICKEL COMPANY, INC.
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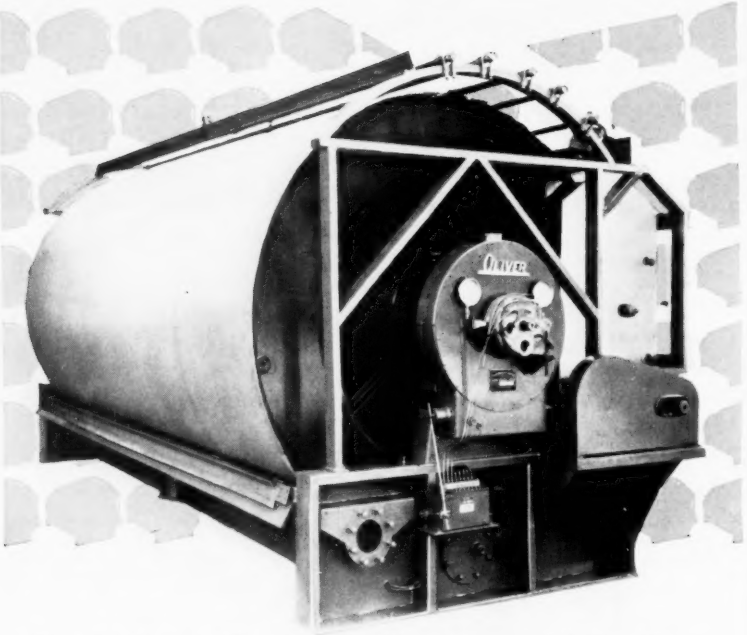
NICKEL ALLOYS PERFORM BETTER LONGER

"Every 12 Days for 25 Years... an Oliver Campbell* Filter to the World's Cane Sugar Industry..."



During the past *25 years* Dorr-Oliver has supplied 775 Oliver-Campbell Filters to the world's cane sugar industry — an average rate of *one every 12 days.*

Today every Oliver-Campbell Filter made is guaranteed by a quarter century experience in design, engineering, manufacture, *and performance* represented by more than *775 units* in every sugar producing area of the world.

Typically, in 1956, 28 O-C Filters have been purchased by sugar factories in Barbados, Cuba, Dominican Republic, Ecuador, Hawaii, India, Mauritius, Mexico, Peru and Puerto Rico — demonstrating the industry's continuing reliance on this experience.

*Oliver-Campbell — T. M. Dorr-Oliver Incorporated, Reg. U. S. Pat. Off.

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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

burst point. Indicator gauge is not part of pressure system. Instrument has superpressure female adapter for ¼-in. OD 1/16-in. ID tubing.

•

Diaphragm Valve: Hills-McCanna Co.'s (Chicago) new plastic diaphragm valve, made of Hercules' Penton, is designed for operating conditions of 300 F at 50 psi. with good dimensional stability. The valve's resistance to chemical attack approaches that of glass, says the firm. Sizes: ½ to 2 in. with threaded ends only. Valve types: handwheel, lever, sliding-stem and air-operated. Valves are compatible with plastic and metal piping.

•

Density-Measurement System: Industrial Nucleonics Corp.'s (Columbus, O.) new AccuRay Density System will measure and control fluid density, related quantities of liquids, slurries, divided solids, without physical contact with the material. Measurements, based on radioisotope gamma-ray transmission, are independent of flow rate and pressure. Accuracy ±0.001 to ±0.003 specific gravity; sensitivity: 0.0001 specific gravity.

Water Tank on the Move

This 200-ton, 197-ft.-high water tower was recently moved nine miles to a new location at Edwards Air Force Base in California. The transfer exemplifies the modern moving theory —that size and shape of plant equipment pose no unsolvable moving problems. Star House Movers (Los Angeles) performed the task using 12 dollies—four at the front, eight at the rear of the tank's 60-ft.-wide base.

More BROMINE

for chemical processing

Now you can benefit from the processing advantages of elemental bromine and be confident of a continuous source of supply. Our new bromine plant † at El Dorado, Arkansas, now is in operation; from it you can secure uninterrupted deliveries up to 100,000 lb. tank car quantities. This added capacity to our production from plants at Saint Louis and Manistee, Michigan, permits you to take full advantage of bromine's unique properties and characteristics.

In many instances, bromine can supplant elemental chlorine and fluorine with marked improvement in processing yields, ease of handling, and developing new products. Specifically, you'll find . . .

Bromine compounds increase processing yields in:

Quaternary salt formations, nitrile formations; hydrolysis to carbinols; Grignard reactions in the aromatic series; Ullmann reactions, and Reformatsky reactions.

Bromine offers such processing advantages as:

- Liquidity — no pressurized equipment required.
- Lower oxidation potential than those of chlorine or fluorine.
- Melting points of bromides are higher than those of chlorides or fluorides.
- Exceptionally high densities of bromine compounds.
- Catalytic properties of various inorganic bromides in reactions involving intramolecular rearrangements.

New product opportunities:

- Bromine imparts greater fire resistance to organic compounds than low molecular weight halogens.
- New pharmaceuticals are possible with bromine compounds as intermediates.
- Bromine can be compounded to produce active germicides, bactericides, and algicides.

You may discover many other significant and profitable bromine uses now that it is available in quantity. Michigan Chemical will be glad to help you with your present bromine needs, or with your basic bromine research. Just write or phone us.

MC*

*Reg. U.S. Pat. Off.

C-56-14

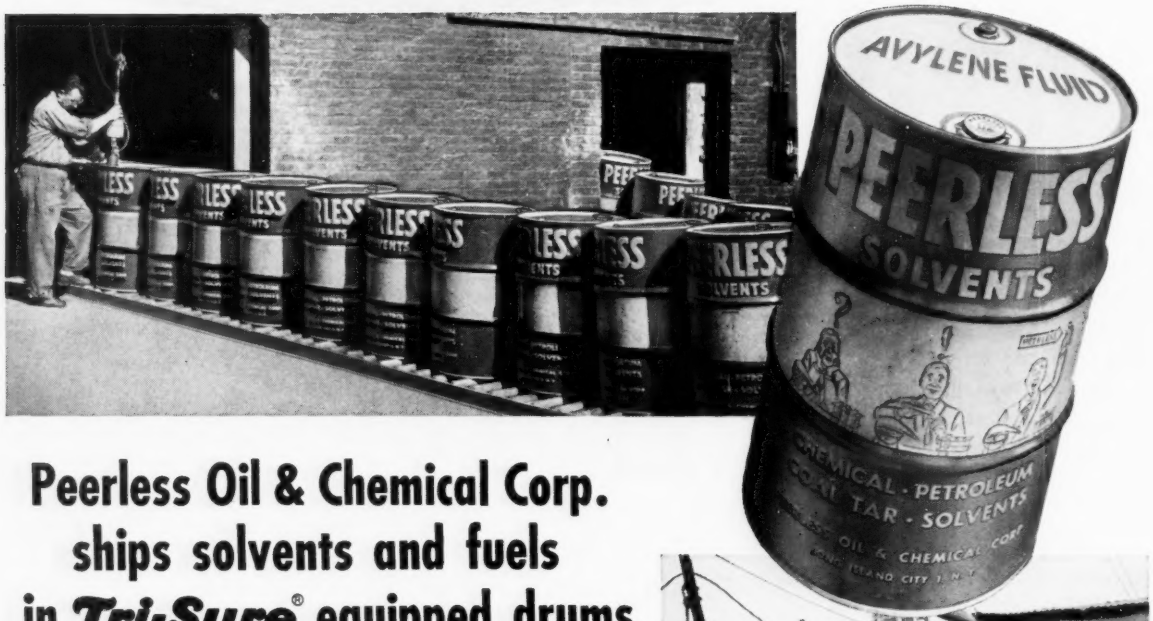
MICHIGAN CHEMICAL CORPORATION

551 Bankson Street, Saint Louis, Michigan

EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York

† A joint-venture project of Michigan Chemical Corporation and Murphy Corporation of El Dorado, Arkansas

Another safe shipment of *Tri-Sure*® equipped drums



Peerless Oil & Chemical Corp. ships solvents and fuels in *Tri-Sure*® equipped drums

AN EXTENSIVE line of solvents, chemicals and diesel fuels are blended, drummed and shipped by the Peerless Oil & Chemical Corp., Long Island City, N. Y.

These include low-pour-point fuels which are shipped to the Arctic for use in the operation of radar nets, and to the Antarctic for International Geophysical Installations—regions where fuel must function efficiently in temperatures as low as minus 74°—and critical-test, power-boosting chemicals for use in aircraft engines.

To prepare and protect drum-shipped products for any exigency, Peerless adheres to rigid specifications, enforces strict quality control—and equips its drums with *Tri-Sure* Closures*.

Peerless, and other leading shippers the world over, have learned that when conditions impose severe demands on drum-shipped products, there is only one choice in closures—*Tri-Sure*. For under *all* conditions, in *all* climates, the interengaging Tri-Sure *Flange*, *Plug* and *Seal* give unfailing protection from leakage, seepage and losses.

Your next shipment—of any product, to any destination—will be *secure* in Tri-Sure equipped drums. Play safe *now* and specify "Tri-Sure Closures" to your supplier.

**The "Tri-Sure" Trademark is a mark of reliability backed by over 35 years serving industry. It tells your customers that genuine Tri-Sure Flanges (inserted with genuine Tri-Sure dies), Plugs and Seals have been used.*

Always specify

Tri-Sure

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Tri-Sure S/A Indústria e Comércio, Sao Paulo, Brazil
American Flange & Manufacturing Co. Inc., Villawood, N. S. W., Australia
Compañia Mexicana Tri-Sure S/A, Naucalpan, E. de México, México
B. Van Leer N. V., Stadhouderskade 6, Amsterdam, Holland
Van Leer Industries, Ltd., Seymour House, 17 Waterloo Place, Pall Mall S. W. I, London, England

Union Barriers Are Dropping in the South

Race problems may constitute the South's most dramatic barrier to inroads by organized labor. But race issues have obscured other factors operating to deter unionization of Southern chemical workers. Last week's Supreme Court decision in a case involving the city of Baxley, Ga., is a case in point.

The Supreme Court has struck down a city ordinance that required labor union organizers to get a permit from the city government before seeking new membership. Voiding it —and similar measures—may have sweeping effect in easing the way for unions.

Justice Charles Whitaker, who wrote the majority opinion, cited the restrictive legislation in Baxley, Ga., as making "the peaceful enjoyment of freedoms that the Constitution guarantees contingent upon the uncontrolled will of an official . . . .", a violation of the Fourteenth Amendment.

Resistance Factors: Restrictive legislation is only one manifestation of the factors that are delaying organization of the South. It's of interest to management to note union ideas about antiorganization factors. Interviews last week with leaders O. A. Knight and Walter Mitchell of Oil, Chemical & Atomic Workers and International Chemical Workers, respectively, revealed these four main characteristics of Southern thinking that foster resistance to the chemical union movement:

- Apathy of older workers—union-minded young workers go to other areas of the U.S.
- Complacency—contentment with good jobs has sidetracked desire for more.
- Mental association of unionism with radicalism.
- Fear of integration of Negroes with white workers.

In explaining these four factors further, union officials point out that they are interwoven; none can be said to operate independently. According to Knight, the emigration of young workers to the North left people on the farms and in older industries who were "the tired, the dispirited, the ones afraid to take any chances and resentful of change—hardly the leaders who can carry out an organization campaign."

UNITED PRESS

Justice Whitaker: His opinion tears another barrier down.

Those who are left have seen new chemical plants rise in the past five years and have transferred from old jobs or left their farms. "However low we may think it is, the pay, by the standards of the people, is quite good. So, there is no awareness of economic deprivation . . ."

Moreover, the newness of the industry and the social unheavals it has generated, coupled with generalities about union morals, has resulted in an attitude that unions essentially mean "radicalism," which in turn is equated with "the NAACP, integration and the breakdown of Southern social structure. This constantly fostered climate of opinion makes organization of workers extremely difficult."

Ordinance Trouble: On such specific matters as the Baxley ordinance, Mitchell reports that "none of our representatives has ever been arrested in the South, nor have they ever registered in compliance with such laws. However, ... the presence of them has served as a psychological deterrent, to say the least."

Though the CPI has trooped Dixieward for many reasons—people, raw materials, land, transportation—management has enjoyed freedom from difficulties of dealing with militant organized labor.

National unions, on the other hand, have unremittingly scored employers and townspeople for their efforts in proselyting nonunion labor and promoting an antiunion atmosphere.

Changing Climes: The factors that deter union organizing are changing ones, however, as witness the Baxley decision, and the halting successes of some integration efforts. Younger workers are beginning to stay home to work in the new plants; part-time farmhands are moving their families closer to plant towns and gradually looking on steady jobs as sole income sources. Too, the chemical unions are making sure that the public stands they take on most issues are conservative. While they realize that they will always be identified with any "radical" statement made by any union leader, they are trying hard to avoid any direct identification with the "radicals." Just how successful they will be remains to be seen. But they are trying.

As a result, the natural barriers to unionization, if not dropping, are certainly softening. For management, in many areas content to rely on ingrown feelings of Southerners to maintain nonunion attitudes, the softening may herald a search for better tools to convince employees they have no need for collective action.

These, of course, would include usual steps to provide good working conditions, sound regional pay scales, and healthy employee-management relations. But when and if the unions renew their recession-abated organization drive, the tools may have to be sharpened to a finer edge.

From the standpoint of the unions, the barriers are under full siege. As Mitchell sums it up, "by Southerner speaking to Southerner, unionism will flourish in the new chemical installations . . . . . when we show working people the means whereby they can help themselves . . . . they are not going to be fobbed off."

This Ad Favoring Reciprocal Trade Brought These Reactions from CPI E

Industries Surveyed	CPI	A
Number of respondents	234	
Attitudes:		(p
Favor reciprocal trade	59.8	7(
Favor, with reservations	11.1	
	70.9	
Against reciprocal trade	5.6	
Against, with reservations	1.3	
	6.9	
Both favor and against	0.4	
No opinion and no answer	21.8	
	100.0	

For CPI Executives: A Changing Tariff A

There's a new straw in the wind this week that may indicate that chemical process industry executives may not be as protectionist-minded as critics have contended. Certainly, a new survey appears to show, they are not as "tariff-happy" as some persons outside the CPI are prone to claim.

The new indication of CPI thinking on the question of reciprocal trade and tariffs comes from the measure of reader reaction to a group of advertisements for the Swiss watch industry. These appeared last summer in four McGraw-Hill publications.

Some 3,500 subscribers to the magazines—CHEMICAL WEEK, *Aviation Week*, *American Machinist*, and *Electrical World*—were asked to give their impressions of and reactions to advertisements that stressed the quantities of chemicals, electrical equipment, machine tools and aviation equipment that were purchased in Switzerland with dollars earned from the sale of Swiss watches in the U.S.

The survey—conducted for the Watchmakers of Switzerland by Win Nathanson and Associates, New York public relations firm—was mailed to subscribers on selected lists provided by McGraw-Hill. Forms that required no individual or company identification were mailed to 1,000 subscribers to CHEMICAL WEEK and to a like number of subscribers to each of the other books (only 500 went to *Electrical World* subscribers).

Chemical Angle: The ad, which appeared in the Aug. 31 issue of *CW* (pp. 4-5), pointed out that in 1956 Switzerland bought $34 million worth of U.S. chemicals, including pharmaceuticals, sulfur, methanol, flaxen oils, machine oils, aniline dyes and resins.

After the ad had a few weeks to make its impression, the questionnaires were mailed. In addition to general impressions and reactions, the survey asked for specific comments on reciprocal trade and export sales of the reader's particular industry.

The 234 CPI executives responding to the survey (*table, above*) indicated they favor reciprocal trade by an overwhelming majority. Almost 71% favor reciprocal trade with or without restrictions. Only 6.9% are opposed. Only aviation industry executives, most liberal traders among those surveyed, topped CPI in voting for reciprocal trade—aviation executives favor the principle of reciprocal trade by almost 80%, with 3.3% opposed.

Opinions Varied: The more militant attitude expressed by CPI respondents in favor of low tariffs is typified by the executive who wrote: "Personal interest and the federal government have gotten together and fouled up the works again . . . Reciprocal trade is necessary in order to bring into

CPI Executives

	Aviation	Machinery	Electrical
	183	163	115
	(percent of replies)		
	70.5	56.4	61.7
	6.6	11.7	4.3
	77.1	68.1	66.0
	3.3	4.3	1.7
	—	0.6	0.9
	3.3	4.9	2.6
	1.1	0.6	—
	18.5	26.4	31.4
	100.0	100.0	100.0

ff Attitude?

this country essential raw materials and to distribute many of our products beyond our own requirements of consumption."

Another executive, evaluating reciprocal trade in the light of world conditions, wrote: "In a world full of nationalistic trouble spots, a conscious effort to develop sound trade principles should create better understanding.

The protectionist-minded group responding to the survey—while not so large—also had several vociferous spokesmen. Wrote one executive: "They (foreign manufacturers) don't pay the help enough. They have taken 90% of our business on price."

Another respondent commented: "Disapprove. I would support high tariff walls even at the expense of exports."

And, referring specifically to the ad, one CPI executive avowed: "$34 million in U.S. chemical sales (to the Swiss) is a trifle, compared with what we lost in dollar volume from the countless Americans who have lost their jobs because of this striking competition."

Four-Year Change: The survey reflects some change in CPI thinking over the past four years. Results of an earlier *CW* survey (*CW, July 25, '53, p. 15*) showed that 45.2% of chemical companies surveyed were hurt because U.S. tariffs were too low on chemical imports (23.8% indicated they were not hurt by any tariff situation).

The same survey, however, also showed that 52.4% of the companies responding favored reciprocal treaties for low tariffs, to encourage international trade. Almost 10% then said "keep tariffs approximately at their present levels," and 4.8% said they favored high protective tariffs. Interestingly enough, 4.8% also favored free trade.

Replies to the '53 survey indicated that the prevailing sentiment was for keeping the country's tariff policies in effect for the next year or so, with occasional cautious adjustments to permit more international trade. But nearly all replies voiced the opinion often expressed in the recent survey: specific products and segments of the industry need protection.

Both surveys reveal that among chemical companies indicating a squeeze from imports, foreign wages, resulting in lower production costs abroad, are listed as a major reason for the need for protecting U.S. industry.

Critical Time: The attitude of nationally influential process industry executives toward the principle of reciprocal trade is particularly significant at this time.

Both the Administration and Congress are now girding for battle over the 10th extension of the reciprocal trade law—the Trade Agreements Act of 1934—and the weight of CPI opinion might significantly swing Congressional attitude.

The Administration is on record as favoring a five-year extension of the act (normally extended for only two years at a time) and amendments giving new authority to the President to reduce any rate of duty existing on July 1, 1958:

(1) By 5% of the duty annually for five successive years, or, as an alternative, to reduce a duty by the same accumulative total amount over a three-year period if no yearly reduction would exceed 10% of the '58 duty.

(2) By 3% *ad valorem* without yearly reduction exceeding 1%.

(3) Up to 50% *ad valorem* if an existing duty is in excess of that amount. In these cases, not more than one-third of the total reduction can be made in any one year.

All safeguards in the present act would be continued, and, in addition, increased authority will be requested to permit the President to raise duties to prevent or remedy serious injury to domestic industries.

Some Industry Views: Spokesmen for certain segments of CPI have already expressed their views on trade policies and tariffs before Congressional committees, and others are certain to follow in the coming months.

One is Du Pont's P. K. Lawrence, chairman of Synthetic Organic Chemical Mfrs. Assn.'s International Commercial Relations Committee. Testifying before the House Ways & Means Committee last December, he said there had been a misunderstanding about his organization's (SOCMA) position on protective tariffs for the chemical industry.

Lawrence said SOCMA doesn't want a "tariff wall around the industry;" just enough protection to "make up the difference in costs" between domestic and foreign producers.

Allied Chemical & Dye's Richard Hansen, chairman of Manufacturing Chemists' Assn.'s International Trade and Tariff Committee, told the same group of congressmen that there are a few areas in the chemical industry—producers of specialty items, for example—that have been "very seriously hurt" in the last few years by foreign competition. He, too, asked for a method of offsetting differences in domestic and foreign costs, on a product-by-product basis. Both SOCMA and MCA favor extension of reciprocal trade, but are against further expansion of the President's power to set duty rates independent of Congressional say-so.

Opinions on U.S. tariff and trade are many and varied. But these variants aside, it appears that CPI executive attitude toward reciprocal trade is undergoing a change, and this change may have a significant effect on future U.S. trade policies.

LEGAL

Municipal Taxation: The Wisconsin supreme court has handed down a municipal tax ruling that's expected to have far-reaching effects on all manufacturing. It opens manufacturing raw materials to local taxation.

The court upheld the right of the city of Algoma to levy personal property taxes on 50% of the lumber and veneer stock of U.S. Plywood Co. The materials were imported for use in plant operations.

Though the federal Constitution prohibits state taxation of imports, this restriction, the Wisconsin court said, had been designed to prevent seaport states from taxing other states and thus burdening commerce. The question of taxation of raw materials stored in original packages at an importer's factory and essential to current manufacturing needs had not been expressly answered since the constitutional restriction was adopted, the court said.

The main problem resolved by the court was whether the Constitution prohibits imposition of a city's property tax on imported raw materials in their original packages. Only one of the seven justices on the court said it does. This question is likely to get prime consideration from the U.S. Supreme Court if, as seems likely, it takes the case on appeal.

•

Florida Pipeline: U.S. Court of Appeals for the District of Columbia has upheld for the second time Federal Power Commission approval of a $150-million natural gas pipeline to Florida. The court's decision will make possible Florida's first statewide natural gas system.

The full court, in an 8-1 decision, refused to review a rehearing petition filed by the Florida Economic Advisory Council. Last December, a three-judge division of the court denied rehearing on the original petition, which sought to block construction of the line.

•

Merger Fee Suit Dropped: A lawsuit to collect a $250,000 fee for negotiating the merger of Durez Plastics & Chemicals and Hooker Electrochemical has been dropped. The suit was filed by insurance broker Chandler Wells in New York supreme court against Harry Dent, former Durez president.

UNITED PRESS

Strike-taker Hazard: Management has been too timid over wage hikes.

LABOR

Strike Call: A chemical process executive has called for industry to take a stronger stand against wage increases—he calls them major contributors to creeping inflation—and suggests acceptance of costly strikes rather than granting pay hikes.

Leland Hazard, vice-president and general counsel of Pittsburgh Plate Glass Co., told financial men in Philadelphia that wage increases are responsible for price increases. Hazard said "management must begin now to refuse wage increases, even though we know our refusals will bring strikes. We have been too timid about strikes."

•

OCAW Rejection: St. Joseph Lead Co. employees at its Josephtown, Pa., zinc smelter have voted against representation by Oil, Chemical and Atomic Workers Union, AFL-CIO. The vote was 282 for, and 626 against the union—932 voters were eligible. The vote was ordered by the National Labor Relations Board.

•

Settlement: At Tonawanda, N.Y., Union Carbide factory employees represented by OCAW ratified a two-year contract four days prior to deadline, calling for a 5¢/hour across-the-board wage increase, with a 30¢/hour Sunday premium and 2½ times straight pay on holidays. The contract also calls for a reopening of wage discussions in Jan. '59.

KEY CHANGES

Michael P. Frawley, to executive vice-president, B. T. Babbitt (New York).

John Roach, to vice-president, production and development, Hodag Chemical Corp. (Chicago).

Frank P. Green, to president, Plumb Chemical Corp. (Philadelphia), manufacturer of glass-fiber-reinforced molding compounds.

R. S. Jordan, to president, Upjohn International Operations, Inc., and Upjohn Inter-American Corp. (both of Kalamazoo, Mich.), and board chairman, Upjohn Overseas Corp. (Panama); **R. M. Boudeman,** to executive vice-president, Upjohn International Operations, and vice-president, Upjohn Overseas Corp.; **E. H. Coleman,** to executive vice-president, Upjohn International Operations; **Eugene N. Badger,** to president, Upjohn Overseas Corp.; and **H. B. Roberts** and **J. A. Braun,** to vice-presidents, Upjohn International Operations; all newly formed subsidiaries of The Upjohn Co. (Kalamazoo).

Russell L. Maxwell, to consultant on nuclear applications in industrial and military activities, Tracerlab (Waltham, Mass.).

William H. Brown, to secretary, Harshaw Chemical Co. (Cleveland).

Henry J. Haffner, to superintendent, Green Bag Cement Division; and **James W. Brady,** to superintendent, Activated Carbon Division; Pittsburgh Coke & Chemical Co. (Pittsburgh).

Chester M. Brown, to president, National Aniline Division, Allied Chemical & Dye Corp. (New York).

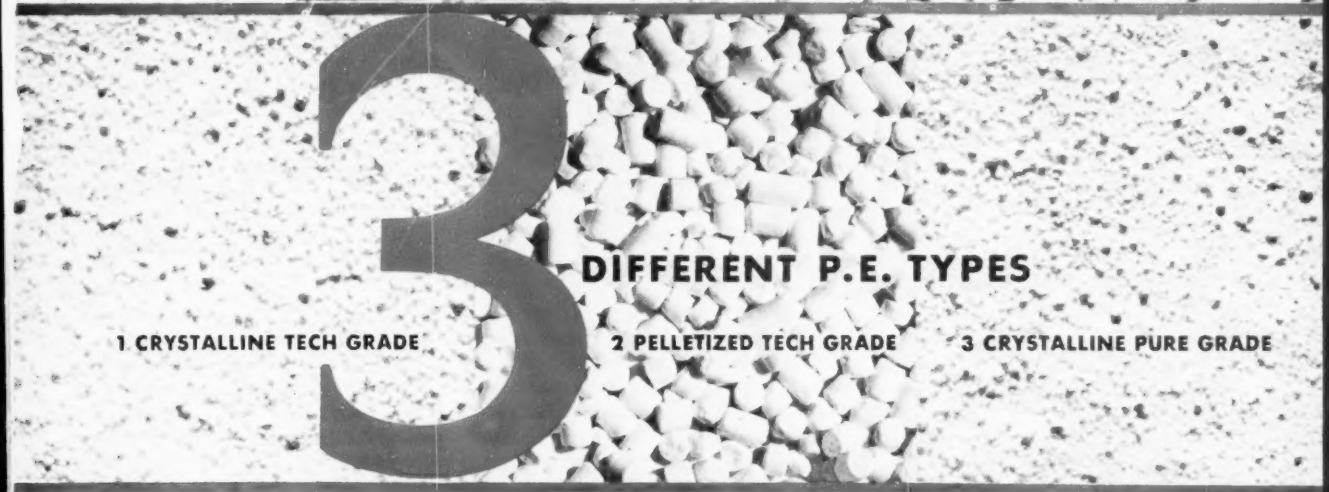
A. Hummel, to board chairman; and **Joseph B. Wiley, Jr.,** to president; Hummel Chemical Co. (New York).

Sevier Bonnie, to board chairman; **Robert P. Bonnie,** to president and treasurer; and **R. M. Ladd,** to vice-president in charge of production and research; Kentucky Color and Chemical Co. (Louisville).

KUDOS

To **Lawrence Flett,** consultant, National Aniline Division, Allied Chemical & Dye Corp., the 1958 Gold Medal of the American Institute of Chemists.

1



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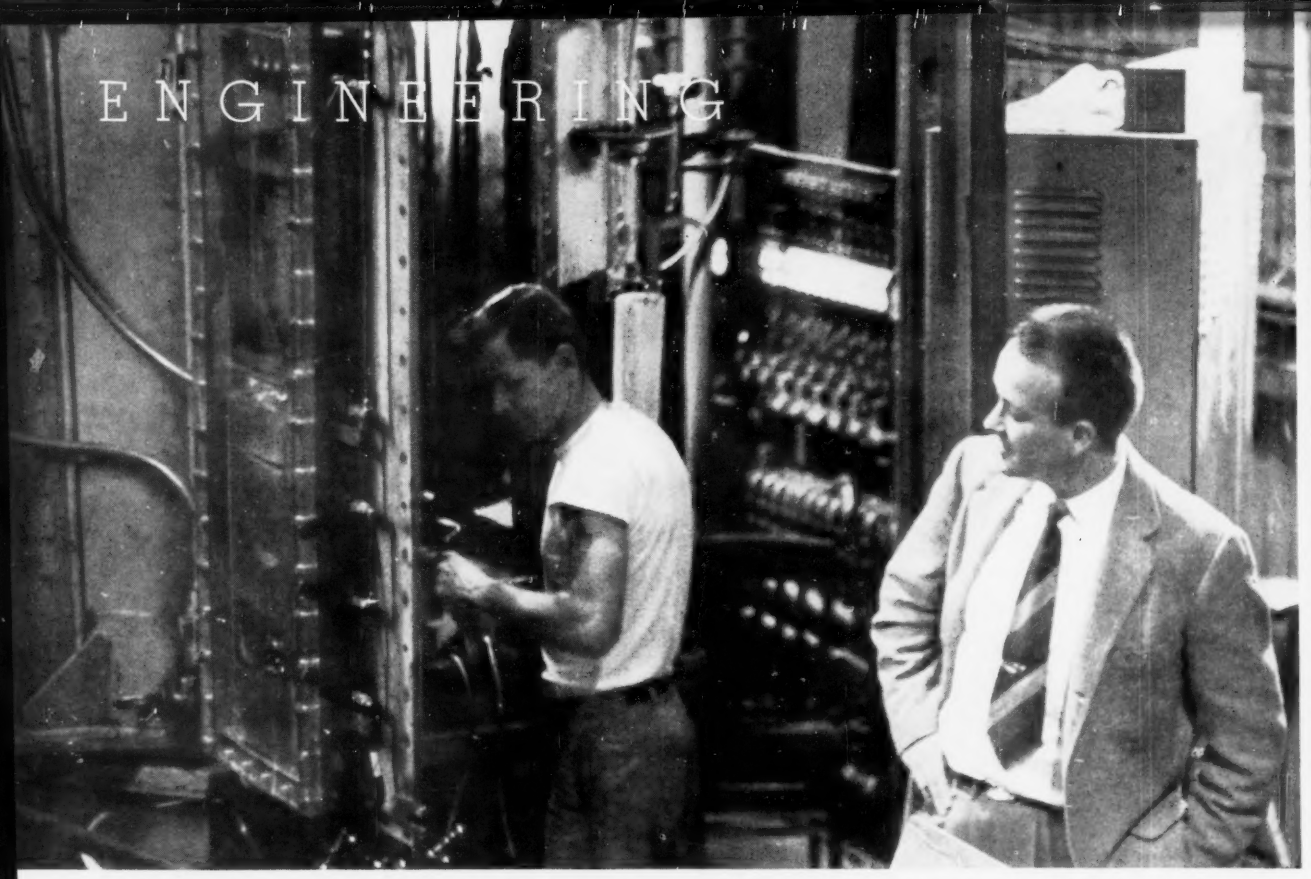


Electron-beam melting furnace is readied for an experimental run at Temescal's development lab.

Readying Electron-Beam Melting for the

This month in San Francisco, Stauffer Chemical, Mallory-Sharon Metals Corp. and Temescal Metallurgical Corp. (Richmond, Calif.) will complete arrangements for the formation and operation of a jointly owned company to commercialize electron-beam melting, a new metal-refining process (CW Technology Newsletter, Jan. 25).

Conceived by Temescal and developed at Stauffer's Richmond, Calif., plant, the new technique employs the principle of electron bombardment to melt and convert into ductile ingots such hard-to-work metals as titanium, zirconium, columbium.

It's still too early to say where the immediate commercial future of the process lies because the full market potential of the many relatively new high-purity metals is still unknown. However, electron-beam melting will probably play its biggest role in the purification of high-melting metals (e.g., columbium, tantalum, molybdenum, beryllium, vanadium, special stainless steel alloys) and refractory materials, such as zirconium boride.

Significance of the process is twofold:

- Electron-beam melting should speed development of these new metals because it will allegedly permit them to be made faster and cheaper.
- It will permit recycle of scrap, thereby eliminating the heavy scrap losses commonly associated with fabrication of parts from these high-cost materials.

Although electron-beam melting will vie with the arc-melting process, it won't replace the latter. Both methods will have a place in the metals purification business. A yardstick for measuring the potential of electron-beam melting: the higher the melting point of the metal, the greater are the advantages afforded by the new process.

The process can also be used as a floating-zone refiner, is said to be even better in some respects than present zone-refining processes. To date, this application hasn't been studied sufficiently to make it of more than theoretical interest. However, it's expected to gain further attention from the new group in the near future.

Party of Four: Four men share most of the credit for perfecting the new technique and shepherding it to the threshold of commercial success. One is Charles Hunt, a cofounder and vice-president of Temescal Metallurgical, who is serving as project manager of the new venture. Hunt is also project leader of metal chloride reduction research at Stauffer's Richmond, Calif., labs. Hugh Smith, the other cofounder and the president of Temescal, is the fundamental research man in the new group. Completing the quartet are Charles Hanks, a physicist in charge of getting ideas from the lab to the production stage; David Vance, general manager of Temescal.

Extending an Invitation: The new combine got its start 3½ years ago when Smith came up with the idea of combining the high-vacuum electron-beam technique with powder-metal melting. When the project proved too

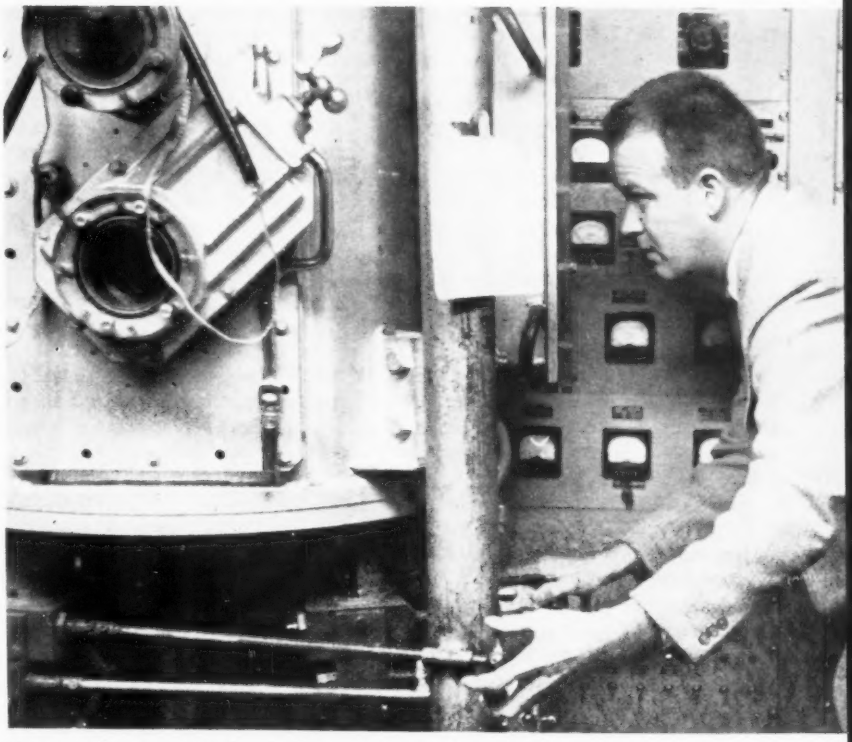
Hunt checks copper crucible (left) while operator positions impure ingot inside furnace (right).

Refinery

big, financially, for Temescal alone, Stauffer was invited, and accepted the offer to support the work. Two years ago, Mallory-Sharon Metals Corp. (at that time, Mallory-Sharon Titanium Corp.) joined as the third member.

The new organization doesn't intend to become a metals producer, instead plans to license the process to interested concerns. It will operate as primarily a research and development organization, with emphasis on providing process and equipment know-how to licensees. In special cases, however, it may do a small amount of custom melting.

New Twist on Old Process: The idea of rapidly purifying metals by melting under high-vacuum is hardly new—the Germans published reports on steel purification by this method as long as 20 years ago. Nor is electron bombardment a novel means of heating metal. Other researchers have employed electron beams on a small scale, says Smith, but they worked with heated crucibles. Prior to



Hunt adjusts controls during test run in small research furnace.

Process makes high-purity ingot from impure rods, chips or powder.

Temescal's work, no one is believed to have coupled high-vacuum electron-beam heating with cold-crucible operation.

Probable secret to the group's success with the new process is its considerable knowledge of large-scale, high-vacuum techniques. Other researchers, who were interested in the method only as a means of preparing high-purity samples on a very small scale, had unhappy experiences with maintaining high vacuum.

Temescal's process, says Hunt, is basically simple. The metal is fed, in rod, chip or powder form, through a vacuum lock at the top of the furnace. The furnace is comparable to the conventional type of vacuum furnace, except that it operates under much higher vacuum (absolute pressure of 10^{-5} to 10^{-4} mm. Hg), therefore requires tighter construction.

As the metal enters the furnace at a predetermined feed-rate, it is heated by the bombardment of electron beams. The beams are generated in a conventional manner: electrons emitted by an electron source (e.g., tungsten) at the cathode are accelerated through an electric field of high negative potential. A focusing system concentrates the electron beam on the metal feed stock (anode).

As the metal melts, gaseous impurities in the form of suboxides (oxides in the lower valence states) diffuse out, leaving behind the pure metal. Especially crucial for this part of the process is the high-vacuum atmosphere that insures speedy devolatilization of the molten metal as it passes into the water-cooled crucible. Key component of the vacuum system is a large, 32-in.-diameter diffusion pump, rated at a capacity of 18,000 liters of air per second when operated at a vacuum of 10^{-4} mm. Hg. Purified metal is removed through another vacuum lock at the bottom of the furnace as a continuous cast ingot.

Furnace capacity depends on the metal being purified. The group's largest operating furnace* can produce ultrapure columbium, for example, at the rate of 10,000 lbs./month (on a 3-in.-ingot basis). Electrical input capacity of the large furnace is 120 kw.

*A small furnace is also available at the company's facilities for small-scale melting studies.

Adding Up Advantages: Hunt and Smith claim several advantages for electron-beam melting.

- Melting takes place in high vacuum, thereby eliminating the chance of contamination from surrounding atmosphere.
- There's no upper temperature limit on electron-beam melting—the only limitations are those presented by the material's boiling away or decomposing.
- Melting occurs in a water-cooled crucible, and possibility of contamination from the crucible material is thereby reduced (it occurs in some hot-melt processes). The operation permits continuous casting of rods and billets, as well as "skull" casting.
- The technique can be used to melt finely divided powder or flakes, as well as ingots. Therefore, pretreatment, such as hot-pressing, to compact the metal before melting is not required.
- Continuous melting process is fast, minimizes loss of time for setting-up equipment.
- During operation, the electron-beam process permits observation, can be stopped and restarted at any time.

Of course, the process is not without some disadvantages. The biggest problem: maintaining the high-vacuum equipment, constantly guarding against leaks in the system. Another disadvantage, in the melting of certain alloys, may arise from the difference in the volatilities of the base metal and of the alloying ingredients. In such cases, the more-volatile constituent tends to vaporize preferentially, changing the original properties of the alloy.

Ready to Go: Now that the joint development has progressed to the doorstep of commercial application, its backers hope to see it reap big rewards in the metal processing industry. Though the companies realize that such rewards may still be a long time in coming, they're planning an all-out effort to make electron-beam melting an important tool of metal processors. And, judging from the interest shown in the process by both foreign and domestic companies, the group will find plenty of support.

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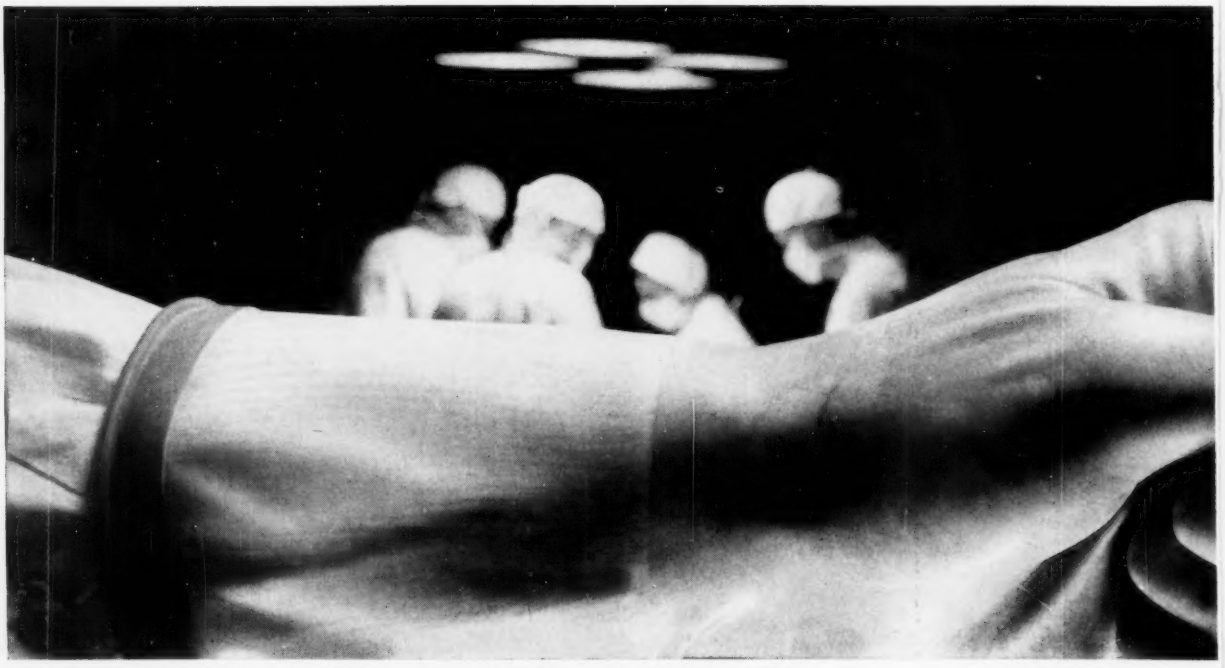

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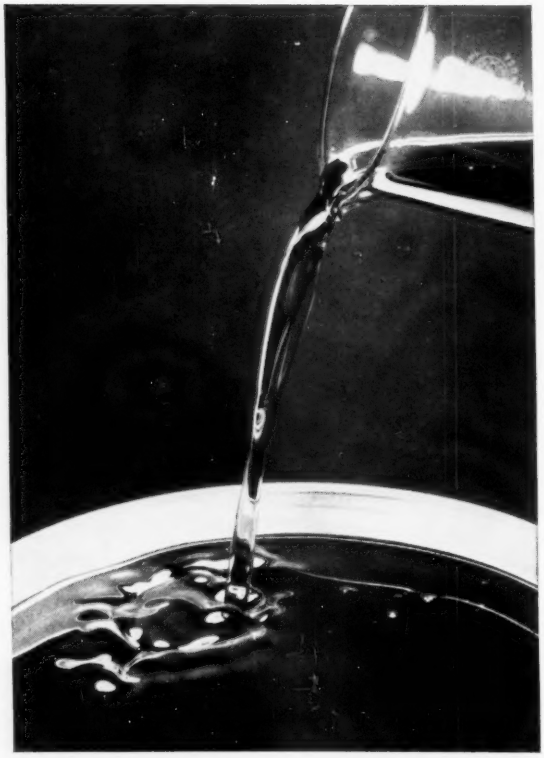

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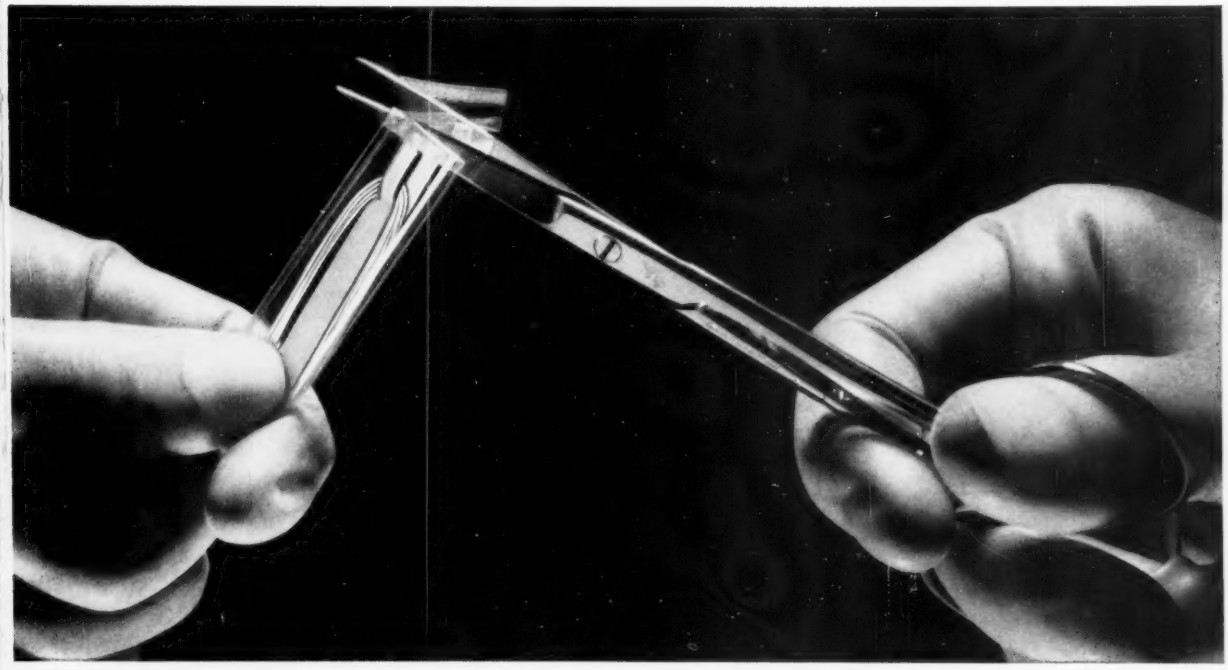

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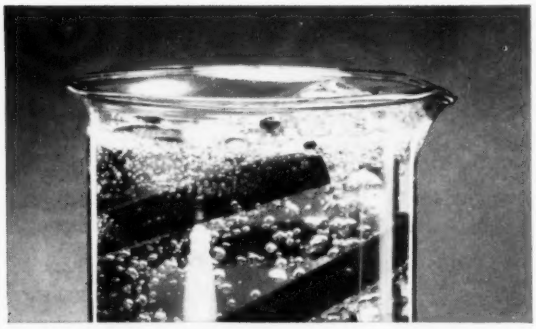

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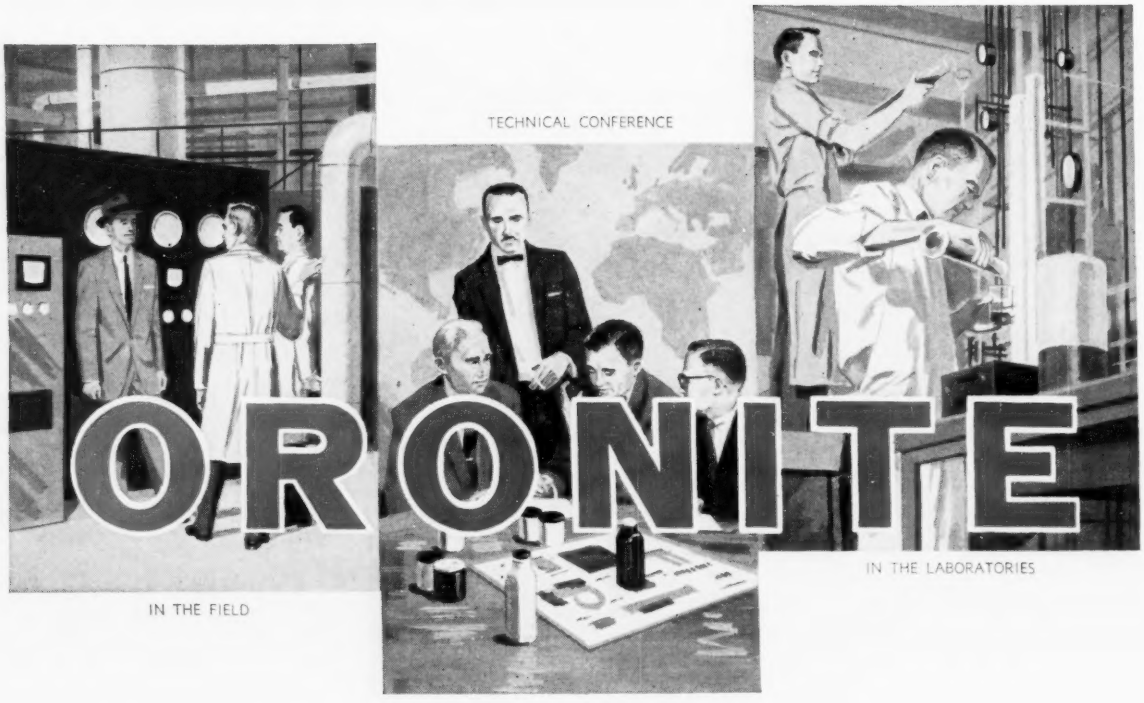

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Acoustica's Rod and Reynolds: First to come up with a detergent for sonic washers, they're . . .

Sounding the Future for Sonic Detergents

The recent introduction by Acoustica Associates (Mineola, N.Y.) of the first liquid detergent designed strictly for ultrasonic cleaning units, Ultrasonic 715* didn't create much of a furor among makers of conventional syndets. But in spite of the product's being only a "specialty" specialty, it could be a real "sleeper," forerunner of a whole new field of wash products.

Ultrasonic 715's market is limited now by the fact that it was specifically created for just one special washer, one of Acoustica's own developments. And needs for that surgical instruments cleaner is still small—only about 100 hospitals now have the equipment.

And though the market for 715 is small now, Acoustica hopes to expand it to tap 12,000 potential buyers of its cleaning units in the nation's hospitals and industrial research labs.

Rob L. Rod, Acoustica's young president, explains that it was necessary to formulate a special product because conventional detergents, Tide, Joy, Spic and Span, etc., didn't permit effective "degassing." Air, trapped in the syndets, absorbs the sound waves, cuts down on the machine's washing efficiency. With conventional materials, it usually takes about eight minutes to condition water for really effective ultrasonic cleaning.

Because the company was interested in developing a completely automatic sonic washer for hospitals it was necessary to come up with a detergent that could cut down on this degassing period. The problem was made more difficult because the machine was designed with an overhead spray which entrapped a lot of air in the washer tank. If the company hadn't come up with a detergent that cut the degassing period to one minute, Rod says, it wouldn't have been possible to make the instrument washer effective.

First Target: Both Rod and his vice-president, Ralph Reynolds, think that their product (and others like it) have tremendous market possibilities.

They set the maximum gallonage the U.S. hospitals may use at 4.75 million gal., with a retail value of $21.3 million. That's figuring 5 washings each hour, each washing using about 2 oz. of detergent, on the round-the-clock basis, by 7,000 hospitals. When this saturation will be reached is conjectural, of course, but it's not far off they think. Besides Acoustica, there are two other firms pushing ultrasonic washers in hospitals—Bendix, and Gulton Industries (Metuchen, N.J.)—and other makers may enter the field soon.

Other coming consumers of an ultrasonic syndet, Rod thinks, are the 5,000 industrial research labs of the U.S., and also manufacturing plants. There haven't been many installations of ultrasonic cleaners in labs so far

*Acoustica's detergent, which it does not formulate itself, is a blend of anionic and nonionic synthetic detergents buffered with a monovalent phosphate salt and built with sodium metasilicate. It has a pH of 9.5 and sells for $18 for a case of four 1-gal. cans.

but over 1,000 plants now have some sort of ultrasonic cleaning operations already. And that represents only about 0.02% of the manufacturing economy. With improved models, Acoustica feels that this market will grow tremendously. Of course, this doesn't mean all these plants will use an ultrasonic detergent, since many ultrasonic cleaners use only solvent systems.

Cause for Hope: A big boost for ultrasonic cleaning is the recent Navy request for bids on an ultrasonic cleaner for assembled jet engines. Figuring about 5,000 gal. of liquid is the minimum necessary to immerse such an engine, there's a goldmine in sight for someone. If an aqueous system is used, Rod says it will require at least half a ton of detergent; if solvent solutions are used, it will require them in tank-car loads.

Outside the industrial field, Rod thinks there's a good chance that eventually a continuous system of ultrasonic cleaners can be designed for economic use in restaurants and bars. John O. Sabatos, head of the National Restaurant Assn. stated publicly that his association would welcome an ultrasonic cleaner to help wash the dishes used in the 78 million meals served in restaurants each day in the U.S.

No Place Like Home: Biggest potential of all for an ultrasonic detergent, perhaps, is the home dishwasher field. And that, according to Rod, is only a few years off. Besides Acoustica, Hotpoint and Bendix are already testing household models.

As described by Rod, the first ultrasonic dishwashers will be the same size as the present washers, will operate at 110 volts, will use about 2¢ worth of electricity per wash, consume about 25 gal. of liquid detergent each year. They'll do a faster, superior job of cleaning than present models and will do it in water about 30 degrees cooler than present models require. Adds Rod, "You won't hear a thing and the only thing you'll feel is the difference in price." Right now he figures that a home dishwasher would have to be priced at around $500 to be profitable.

Trying to peg a market for a detergent for a machine not even on the market is hard to do. One guide to setting a figure: by the mid-'60s the number of installed automatic dishwashers in the U.S. should be around 10 million and they'll be selling at a 1-million/year clip. Even if ultrasonic cleaners capture only a small part of the home dishwasher field, it will still mean sales in the millions of gallons for a specially compounded liquid ultrasonic detergent.

Just how widespread ultrasonic cleaning will become is anybody's guess. If the growth of Acoustica is an indication of the industry's potential, then this is truly a field to watch. Starting with about $2,000 capitalization and three employees, Acoustica has grown from $30,000 in sales in '55 to this year's expected gross of over $1 million. Currently, 125 employees are turning out equipment in four plants.

It might pay other specialty makers to check into the possibilities of an ultrasonic cleaner.

Permanent Switch

"No lotion" home permanents, going into national distribution this month, are likely to cut sharply into today's $90-million home permanent market. Both Procter & Gamble and The Gillette Co., leaders in the do-it-yourself permanent field are launching new "no lotion" products.

Procter & Gamble's Pace goes into national distribution without test-marketing. National sale of Self, Gillette's test-marketed product, will be complete in March.

Both products incorporate the waving lotion into the end papers," but Self, unlike Pace, uses cloth instead of paper to hold the waving lotion. Procter & Gamble's other home permanent, Lilt, now rates second in sales to Gillette's Toni which has about 60% of the home permanent market.

Syndet for Scrubbing Stratoforts

A nontoxic, nonflammable detergent has just been developed by the Air Force (Air Research and Development Command) for cleaning long-range B-52 Stratofort bombers. Up to this time, kerosene-based solvents were used in scrubbing the jet bombers. But water that was used to rinse away the solvent drained into streams, affected fish and wildlife. Now the Air Force feels it has solved the problem—it cleans with its new alkaline detergent, used with water.

A B-52 bomber is cleaned about 12 times yearly, each bath requiring about 5,000 gal. of water. There's plenty of room for syndet use, too—each jet has about one-half acre of surface.

QUIZ

For Multiwall Bag Buyers

"How Does Your Packaging Operation Rate?"

1 Is your bag correctly sized for your product?
2 Is your bag properly constructed for your product?
3 If loss of product is caused by deterioration, would special protective sheets help to reduce such loss?
4 Is the total cost of your bag out of proportion to the selling price of your product?
5 Does your product cost warrant redesigning your bag to merchandise your product more effectively?
6 Are you using the most economical filling machine available for packaging?
7 Are your current suppliers giving you the service you desire?
8 Are your suppliers integrated and capable of maintaining dependable service at all times, under all conditions?
9 Are your suppliers' representatives qualified to help you with your packaging, sales promotion and marketing?

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* The Gilman Corp.
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MONOHYDRATED COPPER SULFATE	35% Copper as metallic packaged in steel drums at no extra cost.
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CUPRIC CHLORIDE	37% Copper as metallic. Available in polethylene-lined drums or bags.
CUPRIC OXIDE	Minimum 76% Copper as metallic. Technical grade . . . NOT A BY-PRODUCT.
SULFUR	
SULFURIC ACID	
LIQUID SULFUR DIOXIDE	Highest commercial quality, available in tank cars, tank wagons, ton cylinders and 150-lb. cylinders.
CHLOROSULFONIC ACID	Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.
SODIUM HYDROSULFITE	T-C HYDRO is a dry, white, free flowing, crystalline powder of uniform particle size and structure. It is dust free, assuring highest stability and uniformity.
PARA TOLUENE SULFONIC ACID, ANHYDROUS	Other organic Sulfonic Acids.
IRON	
FERRIC IRON SULFATE	Partially hydrated, free flowing granular form. Available in bags or bulk.
ZINC	
MONOHYDRATED ZINC SULFATE	36% Zinc as metallic. White, free flowing powder.
ZINC OXIDE	Secondary Zinc Oxide.
MANGANESE	
MANGANESE SULFATE	Designed specifically for inclusion in mixed fertilizer.
MONOHYDRATED MANGANESE SULFATE	93% Mn SO_4, H_2O. Highest purity, technical grade . . . NOT A BY-PRODUCT.
MANGANOUS OXIDE	Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

Samples, specifications and detailed information upon request.

TENNESSEE TC CORPORATION

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SPECIALTIES

PRODUCTS

Lanolin Derivatives: Solulans and Ricilans, two new types of lanolin derivatives, are now commercially available from American Cholesterol Products, Inc. (Edison, N.J.) The Ricilans are polymeric hydroxyesters derived from lanolin, castor oil and other natural substances. Solulans are polyoxyethylene derivatives of lanolin. Both are available in two forms to pharmaceutical and cosmetic houses.

•

Static-Free: Hanson-Van Winkle-Munning Co. (Matawan, N.J.) is now offering three static-free buffing compounds with built-in lubricants for cutting and coloring all types of plastics. The new scratch-free compounds, PC-52 (for medium to heavy cuts on thermoplastic and thermosetting materials), PC-19 (for Lucite and Plexiglas) and PC-93 (for high color work on all types of plastic), are available in all standard bar sizes for manual and automatic applications.

•

Nitro-genesis: Nitrogen packaging of aerosols seems destined to provide the U.S. consumer with a flood of new products in the near future. For instance, two companies not offering toothpastes in the past will try to make themselves household names in that line. The two: Carter Products, (New York) maker of Rise shaving products and Little Liver Pills, which will market a product called Sno White, and Plastone Co. (Chicago), maker of Turtle Wax, which will market a product called Aero-Dent.

The public will also soon get a chance to buy aerosol baby foods (Gerber is reported to be working on this) as well as aerosol coffee (Kwik Kafe has this upcoming) and chocolate sauce (from Nestle) and vitamins (several companies), men's hair cream (Charles Antell).

•

Apple Saver: Chemagro Corp's. (New York) insecticide, Guthion, can now be used on deciduous fruits, according to the U.S. Dept. of Agriculture. Up to now Guthion, the organic phosphate, O,O-dimethyl-s-(4-oxo-1,2,-3-benzotriazinyl-3-methyl) phosphorodithioate, has been used to control cotton boll weevils in the South. Now the organic phosphate is recommended for controlling practically all apple-attacking insects.

New Wrinkle for Wrinkles: Fas-Dri Corp. (New York) has come out with a process for finishing fabrics of cellulosic fibers. The process is said to impart wrinkle resistance, stain resistance, quick-drying ability, higher tensile and abrasive strengths to rayon and cotton. According to the company, all this is achieved through cross linkage of resin and fiber molecules. A merchandising campaign to license the use and name of the process is now underway. Two licensees already signed are Pottsville Dyeing and Bleaching Corp. (Pottsville, Pa.) and Simcoe-Kranz Corp. (New York.)

•

Aerosol Nose-Spray: Winthrop Laboratories (New York) is offering Isuprel Mistometer in an aerosol dispenser. The new 10-cc. unit contains enough Isuprel hydrochloride solution (0.25% active) for 200 inhalations. Winthrop says that its aerosol nose-spray is 90% more efficient than hand-bulb nebulizers, suggests the product is used for relief from asthma, chronic bronchitis and pulmonary emphysema.

•

Ready-to-Use Roof Coat: An all-weather, fire-retardant roof coating that can be applied to wet or dry roofs in extreme heat or cold has been developed by Maintenance Engineering Co. (Philadelphia). Maintenance says the black plastic coating, called Snowbird, may be applied with either a brush or a spray without thinning or heating.

•

Gun Protector: Synthetic lubricants that are claimed to protect guns 10 times longer than previously offered oils or greases are now available in polyethylene tubes from Lehigh Chemical Co. (Chestertown, Md.). The Anderol lubricants are reported to offer protection over a temperature range of 50 to 300 F.

•

Antibug Rug: Bacteriostatic agents got another boost this week when Glamur Products, Inc. (Syracuse, N.Y.), started marketing Easy Glamur, a liquid rug and upholstery cleaner incorporating the germ-killer Corobex. Corobex, a joint product of Bex Industries and The Sintos Co. (both of New York), is claimed to ensure carpets and upholstery against damage by germs, mildew and odor for at least 90 days.

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New Sherwin-Williams Para Cresol Unit Delivers 100% Pure Products

Before Procon began construction of the Sherwin-Williams (Chicago) para cresol unit pictured here, we guaranteed unit performance that would produce product with no more than 0.2% ortho cresol in the bottoms or 2% para cresol in the tops. Procon did the job with such infinite exactness that the unit has produced product 100% free of ortho contamination in the para cresol or para contamination in the ortho cresol streams, as determined by infrared spectroscopy.

Exacting as were the requirements of the job, the unit was designed, engineered and constructed in five months. Actual construction time, from barren site to completed unit, was only three months.

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Technology
Newsletter

CHEMICAL WEEK
February 1, 1958

A process for synthesizing sodium glutamate has been advanced to the pilot stage by International Minerals & Chemical Corp. The company spent five years developing the process, gave the first indication of its work last October. Like Du Pont, which has its own process *(CW Technology Newsletter, Jan. 28)*, IMC is not giving out any details of its process, says merely that it has patents pending.

•

The Navy's breakthrough on solid fuel for its Polaris IRBM is bound to step up developments in solid-fuel rocketry. If the Navy's claims are borne out, the Polaris—and solid fuel—is a much better bet now than it was just a few weeks ago.

Always attractive from many standpoints, solid fuel systems have been plagued with some problems. But these have all been solved, according to the Navy. Among the achievements: control of temperatures—needed to insure even burning of fuel; control of burnout time—necessary to put the missile on target; use of the fuel and engine to steer the missile in flight; thrust comparable to that of liquids.

•

A neutral leach for extracting metals from ores? Chemical Construction's acid-leach and Sherritt Gordon's ammonia-leach have won a lot of attention as a means of getting metal values out of their ores. Now, some German research opens up the possibility of a neutral leach. As reported in a journal *(Erzbergbau und Metallhuettenwesen)*, the idea is applicable to pyrrhotitic ores containing copper, nickel, cobalt, etc.

The ore is autoclaved with distilled water and oxygen. A plate inside the autoclave, moved up and down by a magnetic doughnut surrounding it, provides unusual agitation. Sulfuric acid forms in the reaction but it is immediately taken up by the iron to form a sulfate.

The report states that corrosion is no problem at all. It does not indicate whether there is detrimental abrasive action, however. It's hard to assign any commercial significance to the method now because the work is still in an early stage, but it might someday be an interesting competitor for the acid or ammonia leach.

•

Have the British achieved a true thermonuclear reaction in Zeta? Controversy over this point has been raging ever since experimental results were made public last week (*see p. 29*). The puzzle: Were the neutrons generated by Zeta the product of a fusion reaction or were they produced by collisions of deuterium nuclei with other ionized gas particles?

Dr. P. C. Thonemann, leader of Harwell's gas discharge group, says that even with Zeta, "we are still in a no-man's land where the two possible mechanisms producing neutrons mask each other." Both the total yield of neutrons per pulse and the 300-fold increase in emission rate as the

temperature soared from 2- to 5-million C were in accord with predictions for thermonuclear reactions. But Zeta's emission of neutrons is too low to permit the exact determination of their speed and direction needed to confirm thermonuclear origin.

The controversy may be resolved within the next twelve months if the British achieve temperatures of 15-25 million degrees. Additional equipment needed to boost Zeta's operating range is already on order. And plans for a much larger apparatus—capable of developing "break-even" temperatures of about 100 million C for periods of up to one second —are already being made.

•

General Mills, Inc., will soon produce arginine in bulk quantities for sale to pharmaceutical houses. The key to stepped-up production of this rare amino acid (alpha-amino-delta-guanidinovaleric acid) is a new process developed by Dr. Norval Barker at the company's Central Research Laboratories (Minneapolis, Minn.). He's found a way to isolate high-purity (99%) arginine from natural material.

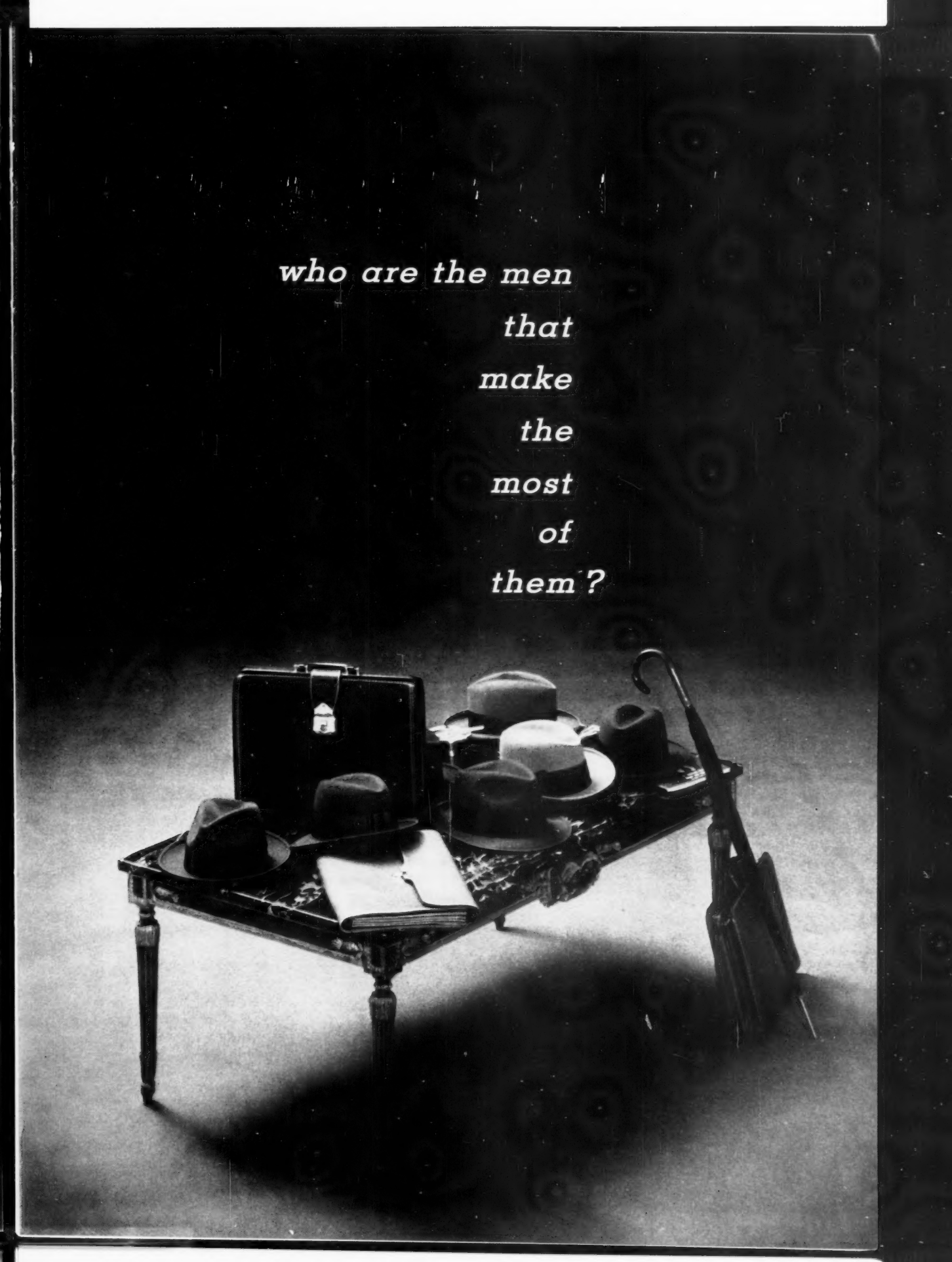
Bulk production is expected to reduce the cost of L-arginine (the free base) from about $90/lb. to about $41/lb. The product will also be made into L-arginine monohydrochloride and a new salt, L-argininium L-glutamate. Arginine and its derivatives have shown great promise in reducing the toxic effects of ammonia in the blood, are expected to find increasing application in the treatment of certain types of shock or coma.

•

W. R. Grace & Co. this week underscored its interest in valve-gate molding by obtaining exclusive licensing rights to a technique developed by Columbus Plastic Products, Inc. (Columbus, O.). The process covers the molding of high-density polyethylene and other types of thermoplastics. Grace's Polymer Chemical Division negotiated the licensing arrangement when it discovered that its own new molding process duplicated work done five years ago and patented by the Columbus firm. CPP employs the method in its commercial molding operations, but prior to Grace's interest had not sought to exploit the process commercially.

Valve-gate molding involves compression of the thermoplastic before it is pressure-injected into the mold. By filling the mold faster than conventional molding systems, the new method is said to reduce scrap losses, to prevent chilling of the plastic and clogging of the mold. It permits design of molds with a large number of inlets to be used for a "big ticket" item, such as housewares. Timing cycles are thereby shortened enabling the molder to make more items per hour.

Under the terms of the new arrangement, CPP will issue licenses on a royalty basis, Grace will arrange licenses and supply technical assistance to licensees. Operating advantages of valve-gate molding, says Grace, may save up to 25% of manufacturing costs of which about 5% would go for installation of new equipment or modification of existing equipment, and toward payment of royalties.


who are the men
that
make
the
most
of
them?

What Blockson Service Means

In Texas, New England, beyond the Rockies... you'll find Blockson customers within a stone's throw from some local phosphate source. Ask any of them why they favor Blockson and you get pretty much the same answer.

"Blockson ships us the phosphates when we want them."

A typical phone call to Blockson shows you what they mean:

An East Coast buyer phones collect to order a mixed car of phosphates, and includes Sodium Silicofluoride and Sodium Fluoride in the car.

"How soon can I get that car?"

"Hold the phone...We'll move the car for you tomorrow — usual routing. We'll wire the car number and trace it... You can look for it Thursday."

This is ordinary routine at Blockson, but it is extraordinary in two important particulars.

FIRST: *At our end, the entire sales, service and traffic operation was handled on the buyer's first and only phone call. There was no cross correspondence, no branch-to-home-office time lag.*

SECOND: *The buyer talked only to one man. This man has the job of taking the red tape out of sales, service and shipping.*

Incidentally, if the buyer had phoned to change, add to, or re-route his order, he would get the same spot service.

Such routine promptness in speeding your chemicals to you is almost without parallel in a company that does so large a volume as Blockson. That's because we use organization to clear the decks instead of cluttering them.

We can put this organization to work for you. Try us.

BLOCKSON IS A MAJOR PRODUCER OF:

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- Tetrasodium Pyrophosphate
- Trisodium Phosphate Crystalline • Monohydrate
- Trisodium Phosphate Chlorinated
- Disodium Phosphate Crystalline • Anhydrous
- Monosodium Phosphate Anhydrous • Monohydrate
- Sodium Polyphos*
- Sodium Acid Pyrophosphate
- Tetrapotassium Pyrophosphate
- Sodium Fluoride
- Sodium Silicofluoride
- Hygrade Fertilizer
- C-29 Sequestering Agent
- Teox 120 (Nonionic Surfactant)
- Hydrofluoric Acid
- Sulfuric Acid

*Sodium Hexametaphosphate—Sodium Tetraphosphate

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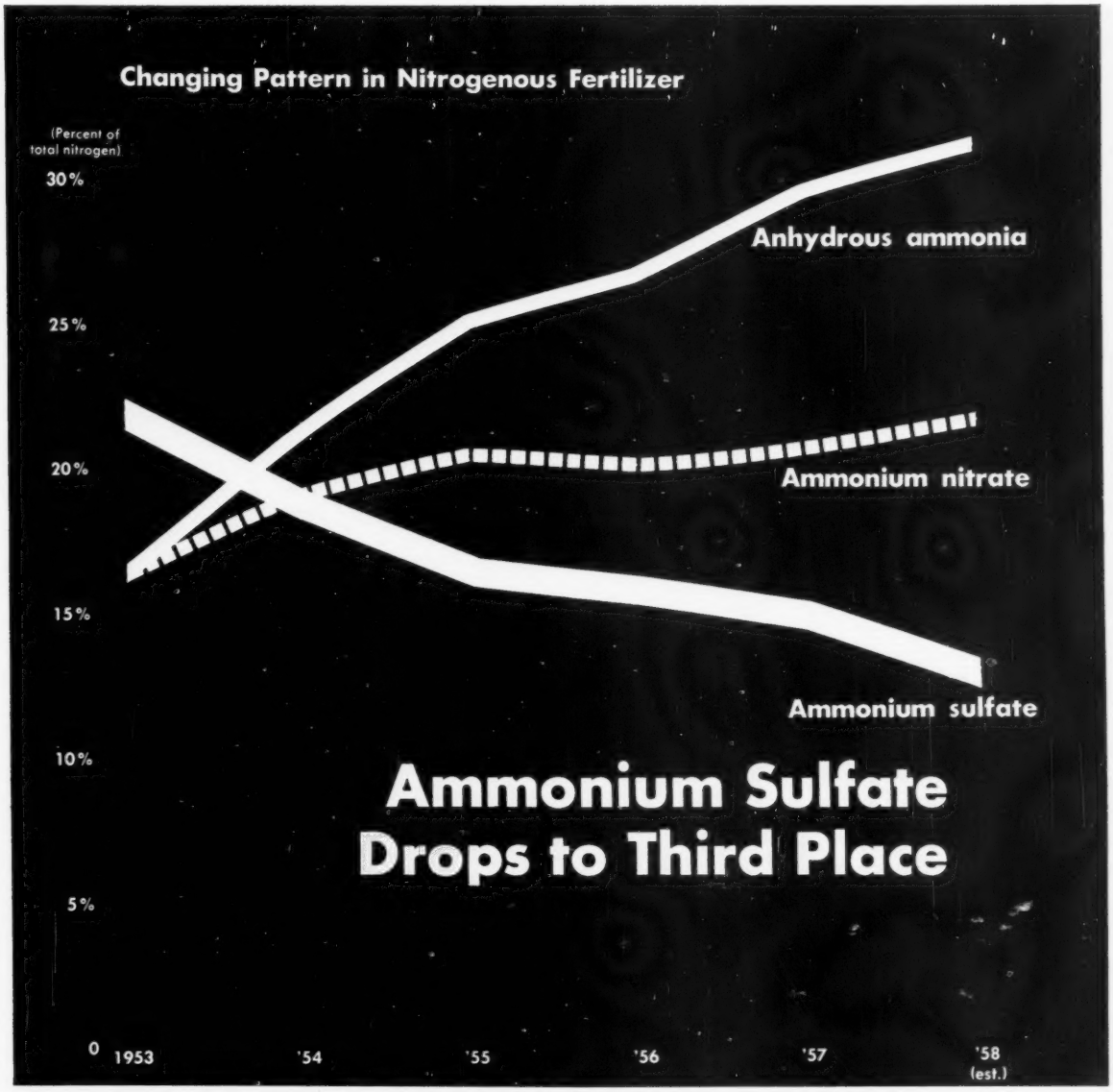


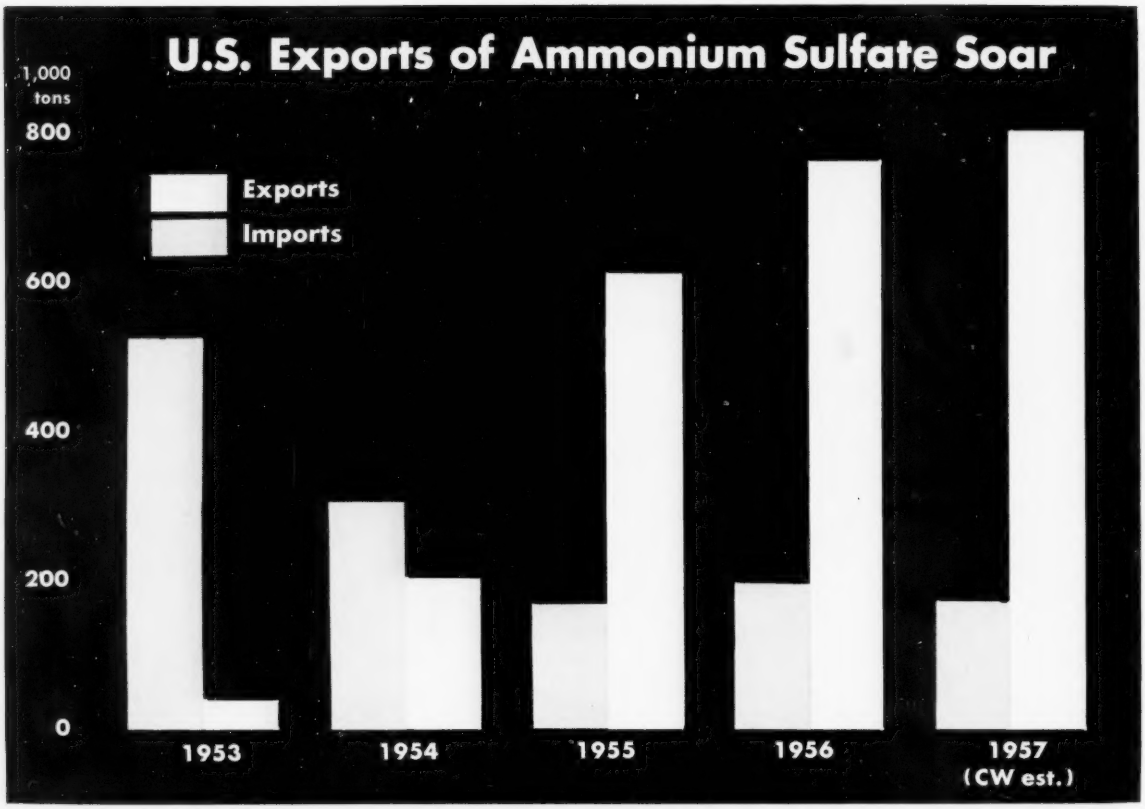
Adaptable Sulfate Makers Aided by Exports

Buffeted by strong opposition from other nitrogen products, ammonium sulfate has, in five years, been pushed down to third-place importance among prime suppliers to U. S. fertilizer makers. Surprisingly, this loss of what is virtually the only market for the sulfate—fertilizers take about 97% of domestic output—has not been ruinous to producers. Even the current prospect—the sulfate getting only 13% of the fertilizer market in '58—isn't as bad as it looks.

There are three main reasons for this view:

- Producers of synthetic sulfate can change with relative ease to the manufacture of other products if the market falters.
- Export market looks good again this year.
- By-product sulfate from the steel industry will be available in reduced amounts.

Synthetic Flexibility: In spite of these factors, however, synthetic and coke-oven sulfate makers aren't pleased with the downward slide of ammonium sulfate in domestic agricultural usage. But of the two, syn-



thetic sulfate makers are least concerned. Reason: they can literally turn the sulfate spigots on or off, in many cases can switch to making other nitrogen materials.

Just how synthetic makers can change with the times was shown in 1950-51. Synthetic sulfate output plummeted from 1.1 million tons in 1950 to about 622,000 tons in '51, when government purchases of the sulfate stopped. (Prior to '50, the government had encouraged production of the synthetic for the Fertilizer Export Plan.) As a result of this, plus the growing sulfate imports, synthetic makers switched to manufacturing other nitrogen products. Later, when imports decreased and exports were again stepped up, producers increased the output of synthetic material.

Bolstering Exports: Because of this agility, synthetic sulfate makers were in a position to contribute much of the estimated 800,000 tons of ammonium sulfate exported last year. Increased exports resulted from renewal of the government aid program and increased foreign demand. By comparison, exports in '53 were a scant 39,000 tons. Imports in '57 were 175,000 tons, compared with 534,000 tons in '53.

Net exports of ammonium sulfate last year amounted to a little less than one-third of total U.S. production, and it's apparent that the synthetic sulfate industry is now geared to demands of foreign markets. Any curtailment in exports would mean a cutback in synthetic sulfate output. However, spokesmen for the industry appear confident this year's foreign demand for the sulfate should equal '57's all-time high.

Steelmaker's Concern: Producers of coke-oven sulfate are not as flexible as their competitors. The ammonium sulfate they make is a by-product of steel manufacture, is directly dependent on the nation's steel output.

More steel, of course, means more ammonium sulfate, and, conversely, any setback in steel output means less coke-oven sulfate is produced. And it's apparent there won't be as much coke-oven ammonium sulfate around in '58 as in past years. Reason: backsliding steel output from the record high of 117 million tons in '55.

Early in '57, steel industry spokesmen were predicting a banner year in '57 and '58. But optimistic forecasts were sent sprawling by shrinking steel orders. Output for '57 was some 113 million tons, or 2 million tons less than was made in strike-affected '56. Now, estimated output for '58 has been trimmed down further, to 102 million tons. The more optimistic observers predict 110 million tons—that's still less than in '57.

At one time, producers of coke-oven sulfate thought

George Buerman,
Director of Purchases,
Ferro Corporation,
Cleveland, Ohio.

"In buying, a supplier's know-how and experience are important, too"

—George Buerman, Director of Purchases, Ferro Corporation, Cleveland, Ohio

Ferro has not only grown in sales (from $3,553,000 in 1946 to $54,507,000 in 1956), but has expanded substantially in the number of products offered to its customers in the home, building, transportation, industrial, and farm fields.

"Over the years we've added fiber glass, color pigments, and complete furnaces for firing porcelain-enameled products, to name a few.

"Purchasing for such a diversified business is complicated and exacting. That's why, in addition to quality and service, an important factor with us in choosing suppliers is their know-how and past experience. These standards are met by Wyandotte.

"For Wyandotte has constantly maintained a policy of having capable, experienced people work with us . . . in fact, one of Wyandotte's representatives was present at the first commercial application of Ferro's porcelain-enamel frit in the appliance industry many years ago. We appreciate suppliers that give us this kind of service.

"Currently, we buy Soda Ash and PURECAL* from Wyandotte."

How about *your* chemical supplier? Are you getting service beyond that called for on the order? Can you count on them to know and understand your needs? If not, see the Wyandotte man, next time he calls. Let him go over your requirements with you. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

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U.S. Ammonium Sulfate Output Levels Off

		Synthetic	Coke-Oven	Total
			(thousand tons)	
1953		576	946	1,522
1954		928	823	1,750
1955		1,131	970	2,100
1956		1,087	887	1,974
1957	(est.)	1,080	880	1,960
1958	(est.)	1,100	850	1,950

they had an answer to the problem of curtailed production when the market is weak. Conversion of coke-oven plants to produce diammonium phosphate was considered an ideal solution. So far, however, at least three producers have converted to this process:

- Colorado Fuel and Iron (Pueblo, Colo.), which combines phosphorus from another plant with coke-oven ammonia to make the diammonium phosphate.
- Ford Motor Co. (Dearborn, Mich.), which uses furnace phosphoric acid in place of sulfuric acid for scrubbing coke-oven gas, thereby getting diammonium phosphate.
- Kaiser Steel (Fontana, Calif.), which has facilities to produce ammonium sulfate and diammonium phosphate alternately, without interruption of production.

Why haven't all other coke-oven makers made similar conversions? A switch to diammonium phosphate (a mixed fertilizer in itself), would mean that converted coke-oven producers would be competing with the mixed fertilizer industry, which already has adequate sources of phosphates. Too, the mixed fertilizer industry is an important buyer of ammonium sulfate. By trying to solve one problem, the coke-oven industry obviously runs into another. Chances are that conversion to diammonium phosphate production would result in little gain.

Consumption Switch: By the end of this year, ammonium sulfate producers will have contributed about 13% of total nitrogen consumed by the fertilizer industry. As recently as '53, ammonium sulfate supplied some 22% of fertilizer nitrogen. The heavy competition has, of course, derived mainly from anhydrous ammonia and ammonium nitrate. These have, since '53, increased their percentages of nitrogen fertilizer requirements from 16% and 16.5%, respectively, to an estimated 31% and 22% in '58.

One important reason for this switchover is the growing consumer preference for the high-analysis fertilizers. This trend has caused a leveling off, since '53, of use of fertilizers in terms of total tonnage, but an increase in terms of plant nutrient consumed—especially of nitrogen materials. The result: in '58, the U.S. fertilizer industry will use some 2.2 million tons of nitrogen—which represents a 37% jump over the 1.6 million tons used in '53.

And the reason why ammonium sulfate has been forced to take a back seat in the changing market picture is obvious. Anhydrous ammonia contains 82% nitrogen, ammonium nitrate has 33%, and ammonium sulfate has a relatively small 21%.

Output Leveling: It's not surprising that output of ammonium sulfate has leveled off since peak production of some 2.1 million tons in '55. By the end of '58, sulfate output will likely drop off to about 1.95 million tons.

Despite the many problems that beset the ammonium sulfate industry, it will continue to play an important—although no longer leading — role in the nitrogen fertilizer business. And what the industry lacks in dynamic growth, is at least partly compensated by the ease with which it is able to maintain a stable supply/demand balance.

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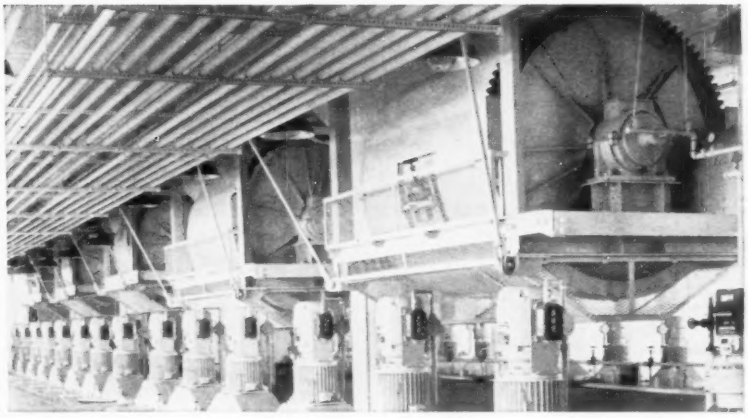
that's FAST, ECONOMICAL with UNIFORM PRODUCT QUALITY

... depend on *Patterson* all the way

Efficient materials handling is typified in this installation of forty-eight pebble mills and mixers at W. P. Fuller & Company, San Francisco. Mills are charged from the floor above and discharged directly into mixing tanks below.



Consistent high product quality in shorter grinding time—at lower cost! This is the net of Patterson Pebble Mill performance, integrated with specific customer operations by Patterson Engineering Service. • The factors of efficient materials handling, optimum mill speed, correct ball and material charge are vital to quality and profits. Let us relate Patterson Mills *and engineering* to your most exacting grinding requirements. Write for a prompt consultation.

ADVANCED PROCESS EQUIPMENT OF ENDURING SATISFACTION

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A Subsidiary of Ferro Corporation

East Liverpool, Ohio

THE *Patterson* FOUNDRY AND MACHINE COMPANY (Canada) LIMITED

Toronto, Ontario

In Regular, Medium, and Low-Foaming Detergents

...THE KEY IS CMC

Regular, medium, and low-foaming detergents all clean more effectively and thoroughly when Hercules® CMC is included. CMC's particle-suspending properties help loosen and rinse dirt down the drain; dirt is never redeposited on clothes. That's why Essential Chemicals Company of Milwaukee, Wisconsin selected Hercules CMC for its "April," "Trust," and "Kenmore" detergents.

Essential's full line of detergent products supplies the right cleanser for hand washing fine fabrics, family laundry, or general cleaning . . . and they all depend on CMC for thorough cleansing action.

If you haven't found out yet how CMC can improve your product, write to Hercules for complete technical information and testing sample.

Virginia Cellulose Department

HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

V558-1

U.S. use of natural and synthetic glycerine topped 248 million lbs. last year, surpassing '56 consumption by some 12 million lbs. "And it will do better—relative to general industrial business—in '58 than in '57," predicted E. Scott Pattison at the soap and glycerine producers' 31st annual industry convention in New York.

Pattison also estimated '57 production at about 238 million lbs., indicated that some 138 million was domestically produced natural material and "suspected" that output of glycerine-from-propylene "remained in the neighborhood of 100 million lbs." He suggested that rising crude imports refined domestically (about 25 million lbs.) may have held down full productive capacity of U.S. synthetic installations.

•

Slowing demand is having a further adverse effect on nonferrous metals. Zinc and aluminum production is being cut; smelters' copper prices have been shaved again; tin producers are meeting in London to try to bolster a "deteriorating" market.

• New York: American Metal Climax said its zinc smelting operation (at Blackwell, Okla.) would soon be reduced from 13 to 10 furnace blocks, cutting slab zinc production by about 2,000 tons/month.

• Montreal: Aluminium, Ltd. said that primary aluminum production at Canadian smelters would be trimmed to about 80% of rated capacity; it's now 90%. That would slice about 5,000 tons/month from Canada's aluminum output. (U.S. aluminum makers are also curtailing production.)

• London: A "lull" in world tin markets was reported while the International Tin Council meeting was in progress there. Whether the tough nut of depressed demand can soon be cracked is moot, of course, but some steps were taken to offset continuing over-supply. Among them: further cutbacks in exports from tin-producing countries.

Last week's additional ½¢/lb. price reduction in custom smelters' copper schedules—which brings the material down to 24¢/lb.—was no surprise. It was a further reflection of the continuing worldwide weakness in the copper market, and it widened the spread between primary and smelters' prices, which had virtually disappeared a couple of weeks ago when U.S. producers of primary chopped schedules 2¢/lb. (*CW Market Newsletter, Jan. 25*).

•

A caustic soda shortage in the next few years? It's a possibility, reported Wyandotte Chemical's Bert Cremers at the annual dinner of the Chlorine Institute in New York last week.

Cremers' talk—loaded with experts' predictions of expanding caustic (and chlorine) need—also swung hard at what he described as recent discussions in print (e.g., *CW, Jan. 18, p. 69*) "inferring in rather

strong terms that caustic soda is becoming a more serious problem-child than it has ever been before."

"The facts," he said, "don't back up such inferences," and he noted that "new chlorine-caustic producing facilities involving an investment of $150 million are under construction." Cremers reported that forecasts by "competent . . . company and consulting economists and marketing researchers" not only support the current expansion but also even hint at the possibility that "caustic may be in short supply at some point along the line."

He cited predictions envisioning caustic productive need at 6-8 million tons in '65, and 11 million tons in '75.

In closing, Cremers stepped "down from the 'Pink Cloud 9,'" as he called it, to speak of the next few months ahead for the industry and the chlorine group; he foresaw '58 as a year of "more work" for all.

Cremers, incidentally, declined re-election after serving two terms as president of the institute and is succeeded by Diamond Alkali Vice-President William McConnell.

•

How firm is the long-time-held 36¢/gal. benzene price? That's the question currently knocking around the industry, especially since stocks are becoming more worriesome. To most observers there appears to be no drastic tag reduction in sight despite speculation to the contrary.

Here's why. Benzene, unlike many chemicals, is usually sold by producers directly to consumers—there are no middlemen to take a first step toward generally lowered prices. And, at the moment, no benzene producer will accept the dubious honor of initiating a price cut, even though benzene tanks are "running over" and some material is being downgraded to motor fuel use.

Any advantage gained by shaving prices would be short-lived: other producers would follow suit immediately. Result: losses for all sellers, with little chance that any additional gallonage would move.

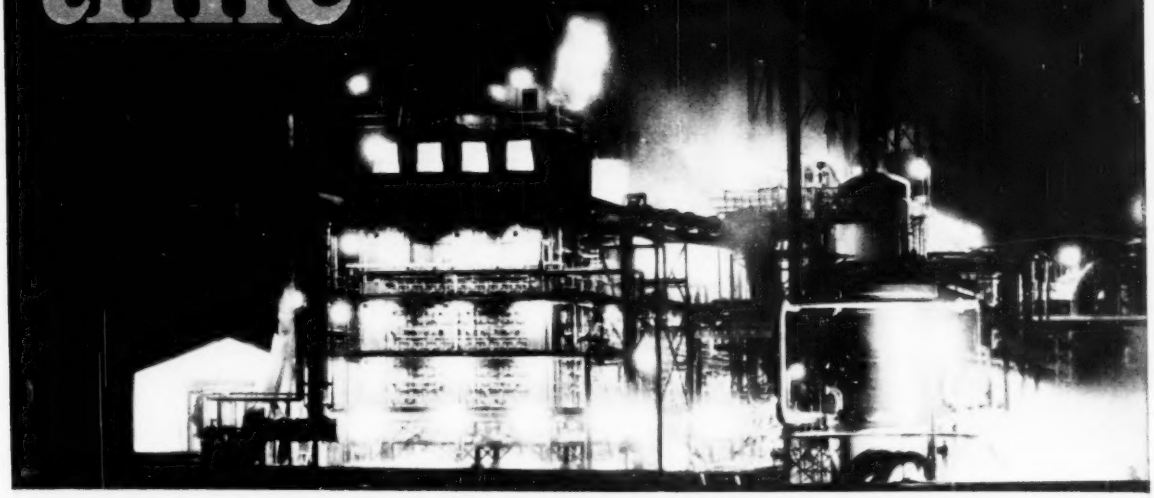
It boils down to this: For benzene makers, risk of industry censure may prove, for a while at least, a more potent price-drop deterrent than tight supply.

SELECTED PRICE CHANGES—Week Ending January 27, 1958

	Change	New Price
UP		
Tankage, animal feeding, 9-11% ammonia, bulk, N.Y.	$0.25	$5.00
Tin, metal (Straits),	0.005	0.925
DOWN		
Mercury, metal, 76 lbs./flk., net flk.	$3.00	$220.00
Tung oil, dms., c.l., N.Y.,	0.0025	0.2275
Xylene, coal tar, Lackawanna, N.Y., gal.,	0.01	0.34

All prices per pound unless quantity is stated.

FORMALDEHYDE all you can use... all the time



Reforming of natural gas in this unit is first step in Allied Formaldehyde production. Carbon monoxide and hydrogen from reformer are reacted to produce methanol. Methanol is then oxidized to produce Formaldehyde.

If your production depends on Formaldehyde, you can depend on ALLIED for uninterrupted supply. At South Point, Ohio, a completely integrated plant makes methanol from natural gas, then processes this material into Formaldehyde. You can always get all you want when you specify Allied.

Allied Formaldehyde, in a wide range of concentrations, is shipped in tank cars and tank trucks from South Point, Ohio, and from customer-convenient bulk terminals.

Dept. F 2-7-3

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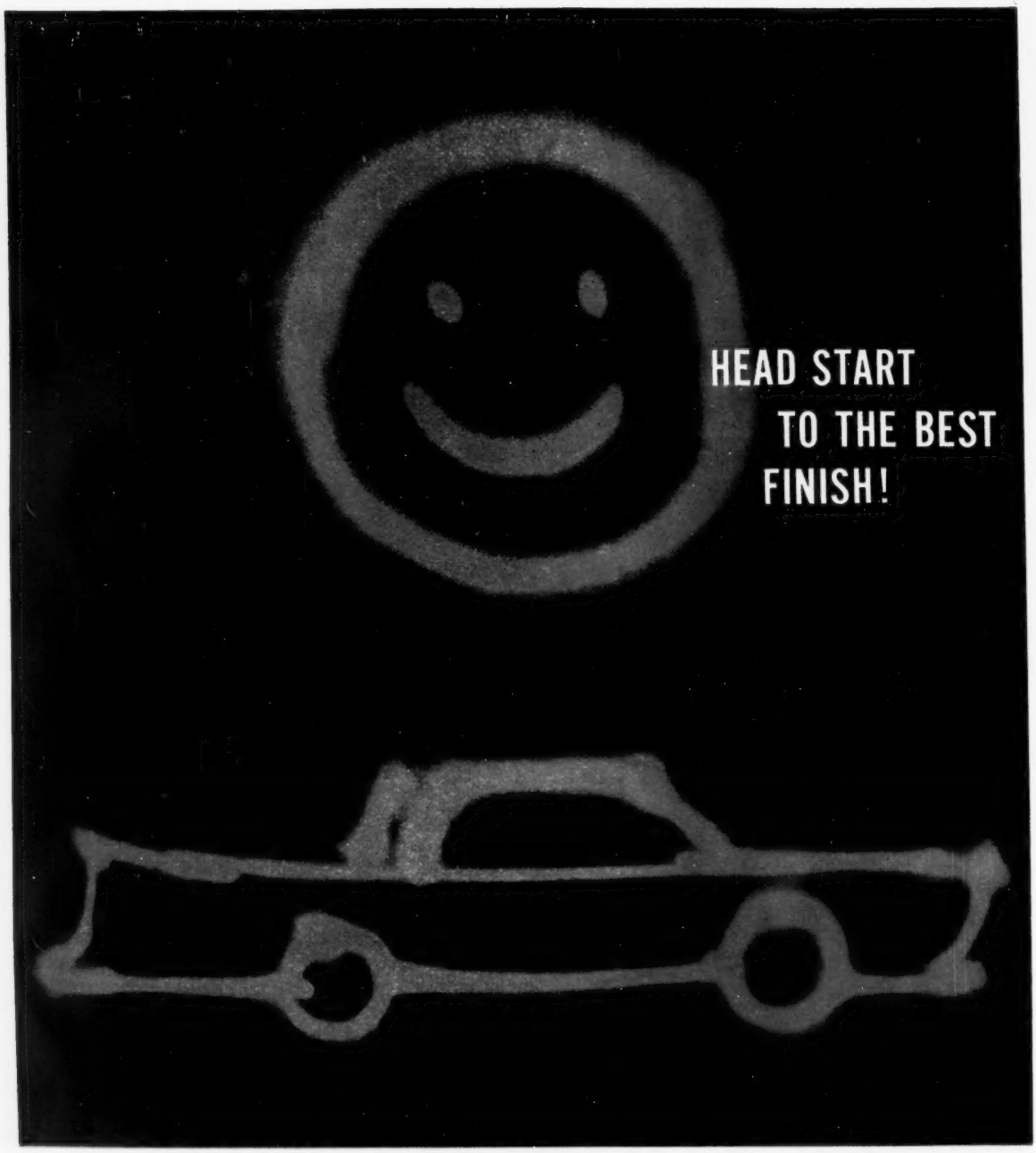

Solvesso 150 has long been a standard solvent in baking-alkyd surface coatings used in the automotive industry. Unsurpassed in uniformity and purity, it is an outstanding member of the high-quality Esso family of aromatic solvents, the solvents that set performance standards *throughout* the paint and surface coatings industry. Esso's excellent customer service combines with the most modern handling methods and key distribution centers to assure you of a constant supply and *immediate* delivery. For a head start to the best finish, always specify Esso Petroleum Solvents. Write, wire or phone today! Esso Standard Oil Company, 15 West 51st St., N. Y. 19, N. Y.

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PETROLEUM SOLVENTS

New Phillips process yields linear polyethylene film that's transparent (left) instead of hazy (right).

Clearing a Way for Lower-Cost Wraps

This week, two new transparent films are getting set to challenge cellophane in its own stronghold—overwrap packaging for cigarettes, food, and the like. Both newcomers are strong versions of linear polyethylene, are said to cost less than equally thick (around 0.5 mil) films of either cellophane or cellulose acetate.

Grex film is made by a process developed by W. R. Grace & Co.'s polymer chemicals division. The other is Marlex 50 film (CW Technology Newsletter, Jan. 25), developed by Phillips Chemical Co. (Bartlesville, Okla.).

While the newcomers' market outlook may be argued, their arrival climaxes a lot of hard—and noteworthy—research. Until about six months ago, linear polyethylene film was opaque or "frosty" in appearance, limiting its packaging applications.

This haziness, according to Phillips, was caused by the slow air-cooling of the melted, extruded polymer—the small crystals that are first formed grow in three dimensions and agglomerate in large crystallites (called "sherulites"), which occupy a major part of the film cross-section. Then researchers discovered that stretching and quickly cooling the film after extrusion improved its clarity. Both new techniques apply this principle.

How It's Done: Phillips quenches the extruded film rapidly in a hot-water bath that is positioned within ¼ in. of the die lips. The film can be extruded at 175 ft./minute in a thickness of 0.4-0.6 mils. Grace is a Phillips low-pressure-polyethylene licensee, but developed its own process independently.

Other firms are researching, too, but none is ready to call its linear polyethylene near-commercial. Celanese, Hercules and Koppers are all known to have clear films in the developmental stage. Bakelite has no comment on its progress. Du Pont isn't expressing much worry about possible competition the new films may have for its cellophane.

Neither is cellophane-maker Olin Mathieson worried. OM tells *CW* it is familiar with the new products and has confidence in cellophane's ability to "maintain its position."

Two other questions about the new films remain to be answered: (1) How fast can they be processed on existing packaging machinery? (2) What is their resistance to impact? (Experimental linear polyethylene film has showed low impact-resistance.)

And on the horizon: polypropylene film—featuring toughness and low cost. It may come along even before the new films have had a chance to prove their merit.

MIN CHEMISTRY *at work*

...news briefs

ON THE CREATIVE USE OF M & C PROCESS MATERIALS

*Granular Herbicides . . .

chemical weed killers with a bright future on farms, highways, railroads, plant sites

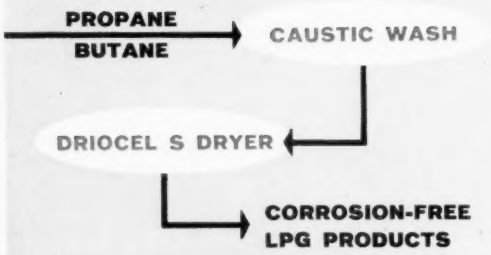
Granular herbicides are easy to make, package, store, handle, apply. With little drift, they pelt through foliage onto the soil. They offer physical and chemical selectivity. Larger payloads can be carried, no water need be hauled or supplied, application methods can vary to suit the case. Popularity has them in use on farms, orchards, right-of-ways for highways, railroads and utility lines, and in industrial tank farms. M & C's Granular Attaclay is the most widely-used base material—well worth looking at. This is a *starred item.* Use the coupon.

Data Based On Professional Entomological Estimates

Petroleum Refiners

get corrosion-free LPG products with Driocel S desiccant

M & C developed this new desiccant to give 5-way help to LPG processors: (1) thorough drying (2) absence of corrosive reaction with sulfur compounds which escape caustic wash (3) no polymerization of unsaturates; (4) low cost (5) long service life. Specific properties of this product also suggest its use in drying chlorinated and fluorinated hydrocarbons.



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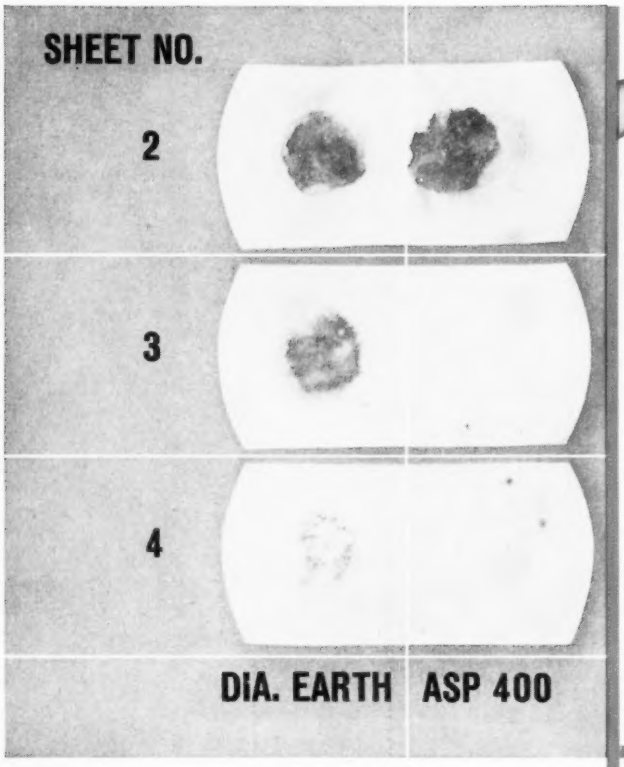

*Adhesive Users: here's superior penetration control to improve products and lower costs (test details on request)

Photo shows superiority of M & C's ASP 400 additive in keeping glue at the glue line (it hardly went beyond Sheet 2 of the stacked papers). Ability of the ASP's to prevent adhesive migration gives adhesive users such positive advantages as: increased mileage; great bond strength; dry, hard products; low costs. Would you like to extend these good points to your glue operations? If one, or both, of the faces you are gluing is porous, it can be done. This is a *starred item*. Use the coupon.

Reinforced Plastic displays doubled impact strength with Aluminum Silicate Pigment filler

Plastic slab under test is a formulation destined for use in making caster wheels up to 12" dia. for industrial trucks. High impact strength is a must. When M & C's ASP filler was introduced, the ASTM 256—56 value jumped to 3.44, just about double industry standard of 1.8. Also improved were the resistance to abrasion and water absorption, and the heat distortion factor.

Manufacturer gets positive production and personnel advantages from thirsty SOL-SPEEDI-DRI® oil and grease floor absorbent

Dust is *taboo* in a miniature precision parts plant. In the operation shown, hardness and dustlessness of Sol-Speedi-Dri help maintain 0.0005" tolerance, cut rejects, improve production, boost personnel morale by keeping plant floors clean, safe and dry.

Use this quick two-check coupon

✓ your product interest . . .
✓ what you need to get tests started . . . we'll fill your requests immediately.

For more data, see Chemical Materials Catalog Pages 358-362.

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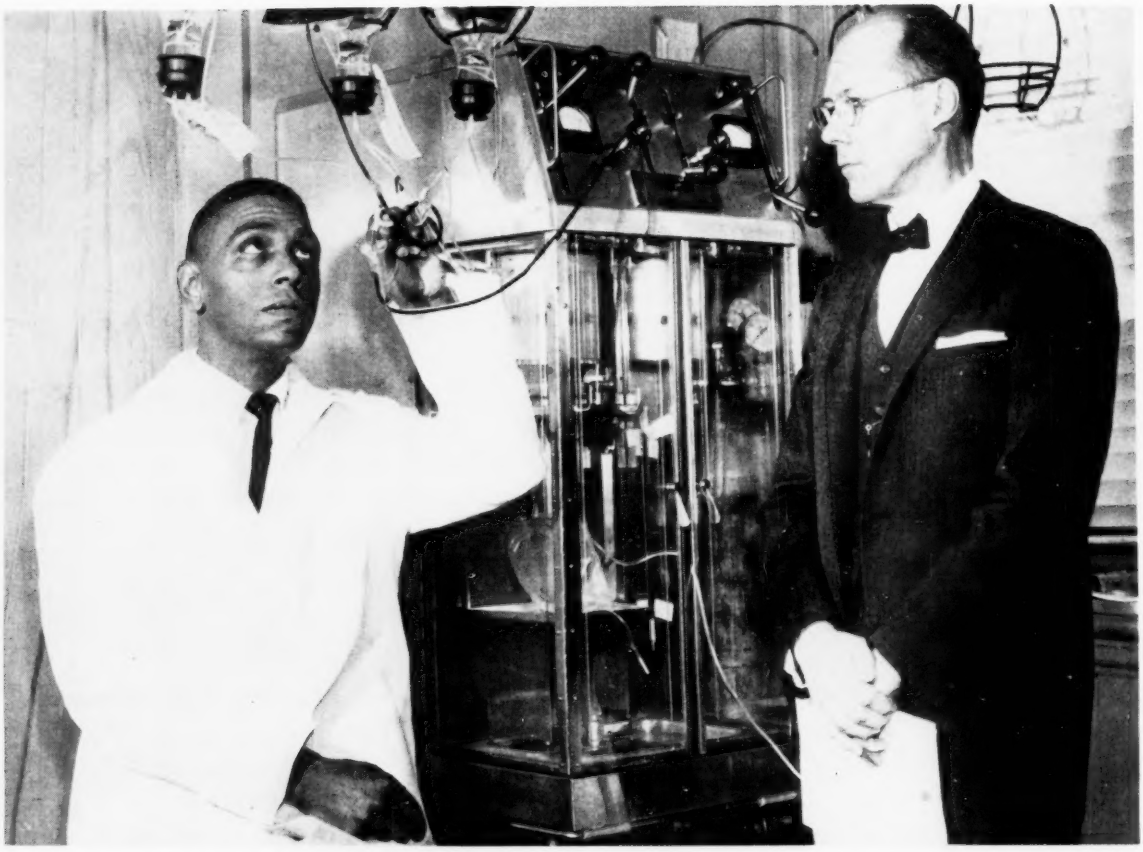

James Tullis watches assistant Robert Tinsch regulate blood deglycerolization unit.

Blood, Fats Studies Win Glycerine Awards

Biochemists took all the honors last week when the Glycerine Producers' Assn. (New York) named recipients of its annual awards for research in glycerine and its derivatives. The three 1957 awards cover work in long-term preservation of blood, using glycerine; phospholipid studies (including a new, highly reliable analytical technique to test the purity of these glycerine derivatives); and research in natural fat molecules.

First prize, $1,000 and an honor plaque, went to James Tullis for work done at the Blood Characterization and Preservation Laboratory at Jamaica Plain, Mass. Tullis-led researchers developed a practical technique to preserve human red blood cells in glycerine (at —80 or —120 C), allow the blood to be quickly available for transfusions. English researchers discovered glycerine blood preservation in 1949, but their deglycerolization method was too time-consuming. The new process could make it possible to store red blood cells for years instead of the maximum 21-day period now necessary (because of cell deterioration). During the past 24 months, 717 units have been prepared, 159 transfused into patients.

Closed System: Key to the Tullis technique is a closed-system centrifuge that permits sterile collection from blood donors, separation of blood into red cells and plasma, glycerolization of red cells and collection for freezing and storage until required for infusion. Prior to storage, the cells are treated with 40% glycerine.

An honor certificate and $300 (second prize) were awarded to Guido Marinetti, assistant professor of biochemistry at the University of Rochester School of Medicine and Dentistry. His achievement: extensive research on the analysis, biosynthesis and chemical structure of phospholipids, derivatives of glycerine found in the tissue of living cells. This work makes it possible to analyze for individual phospholipids directly in a complex mixture and provides a reliable method to test their purity. It also brings researchers closer to solving the mechanisms of human metabolism.

Two Canadian scientists won the third award, $200 and an honor certificate. Henry Sallans and C. G. Youngs, of the Prairie Regional Laboratory, National Research Council (Saskatoon, Saskatchewan, Can.), were recognized for their investigations into the glyceride composition of fats. More knowledge of this kind is expected to help correlate human metabolism with diet, possibly turn up synthetic fats having therapeutic value.

NEW PRODUCT DIRECTIONS

No static charge in triangle on left—treated with CATANAC SN

IF IT'S A SHOCKER OR DUST COLLECTOR

you need **CATANAC* SN** *antistatic agent*

Dust-attracting or "shock" problems due to electrical static charges are easily eliminated by CATANAC SN, Cyanamid's new antistatic agent. Incorporated into resins, it provides plastics with *permanent* antistatic properties. Applied as a surface spray, dip or wipe, it forms an invisible surface film that gives lasting protection from static charge build-up on *any* material.

TEXTILES . . . can be treated during processing by pad or spray to eliminate static. When CATANAC SN is applied to newly formed spun filaments or yarns, subsequent processing is static-free. Coning oils and other processing aids can be compounded to incorporate the benefits of this effective agent.

PLASTICS . . . whether molded, extruded, sheet or filament—can be *permanently* freed of their annoying charge-retaining and dust-attracting characteristics by incorporating CATANAC SN into the monomer, or by treating the molding pellets. Fabricated products, such as phonograph records, television cabinets, plastic housewares, or any type of cellophane or plastic sheeting can be given lasting protection by spraying or by wiping with treated cloth.

GLASS, PAPER, POWDERS, PHOTO FILM . . . are a few of the other product areas in which CATANAC SN contributes antistatic properties that solve production problems or improve finished products.

WAXES, POLISHES . . . for home or industrial use can add antistatic benefits to their performance characteristics when CATANAC SN is included in their formulation.

CATANAC SN is a non-corrosive 65% paste, stable to acids and alkalis and highly resistant to heat. Completely miscible in water, acetone and alchohols, it is adaptable to a great variety of processes and products. Requests for literature or research samples will be welcomed.

New Name . . . Expanded Service

Effective January 1, 1958, our name was changed to the MARKET DEVELOPMENT DEPARTMENT. This is in keeping with our expanded objectives of developing new chemicals or adapting old ones to new uses where particular industries have problem areas. We hope that our expanded market development facilities will increase our ability to serve you.

MARKET DEVELOPMENT DEPARTMENT

CYANAMID

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Market Development Department
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Please send me
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☐ A research sample of CATANAC SN

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RESEARCH

PRODUCTS

Recent Radiochemicals: Research Specialties Co. (Berkeley, Calif.) now has available these radioisotopes: sodium bromoacetate-1-C 14, sodium bromoacetate-2-C 14, guanido acetic-2-C 14 acid (glycocyamine), phenoxyacetic-1-C 14 acid and phenoxyacetic-2-C 14 acid.

•

Multipurpose Plasticizer: Peroxidol 780 is a new light-colored polymeric epoxy-type plasticizer with high resistance to temperature and weather. Manufacturer Reichhold Chemicals Inc. (White Plains, N.Y.) suggests uses in rainwear, garden hose and products subjected to water, soap and detergents.

•

Penicillin Counteractant: Neutrapen, the first successful specific for penicillin reaction, is a new entry by Schen-Labs Pharmaceuticals, Inc. Researchers reported at a recent AMA meeting that the drug was effective 92% of the time, usually with only one injection.

•

Steroid Entries: Four new compounds now offered by Mann Research Laboratories (New York) are intermediates in the biosynthesis of cholesterol and steroid hormones. Included: β-hydroxy-β-methyl-glutaric acid, DL-mevalonic acid as the lactone, DL-mevalonic acid as the N, N′-dibenzylethylenediammonium bis-(3, 5-dihydroxy-3-methylpentanoate), and DL-mevaldic acid as the acetal.

•

Lab Rodents: Mice and rats for research uses are now available from Foster D. Snell's Crippen and Erlich Laboratories Division (Baltimore).

EXPANSION

• **American Cyanamid Co.** is building a product development lab and pilot plant for its plastics and resins division at Wallingford, Conn. Both facilities are expected to be in operation by late 1958.

• **W. R. Grace & Co.** has completed and staffed a new laboratory near Clarksville, Md., for research in catalysts, silicas and agricultural chemicals. A second lab, scheduled for completion this summer, will house facilities for polymer and petrochemical research.

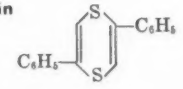
All the verbiage on this page boils down to the simple fact that some 3600 miscellaneous compounds may be conveniently purchased in laboratory quantities as Eastman Organic Chemicals from Distillation Products Industries (Rochester 3, N. Y.), which will upon request mail a catalog of these wares. Having already absorbed this much, the reader is assured that (with statistically insignificant exceptions) he risks little by a stubborn refusal to be further detained here.

...AMONG SOME 3600 ORGANICS

Isn't it *exciting* that during the year just past the number of Eastman Organic Chemicals went up from "some 3500" to "some 3600"! This must mean we are now adding new ones at a faster rate than we are dropping old ones. Accessions, all bright with gleaming new optimism, come about in various ways. For example—

7442 2,5-Diphenyl-p-dithiin

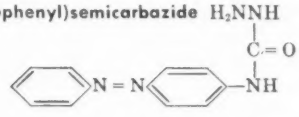
5 g. . . $4.55



We attended a very, very fancy discussion of resonance states in heterocyclic compounds of sulfur. The man was trying to elevate us to a level of chemical understanding where in our mind's ear we would hear the electrons clicking in and out of the different orbital shells of the sulfur atom. We were having a tough time. Our mind has been dulled by immersion in commerce and trade. But we distinctly heard him speak of the dithiadiene ring as starting material for a whole new series of organic compounds, and he practically promised us that *2,5-Diphenyl-p-dithiin* is easy to make. We took heart and tried it. Another victory.

7443 4-(p-Phenylazophenyl)semicarbazide H_2NNH

5 g. . . $4.30



Don't ever get the idea that it's all rhapsodic inspiration around here. There are Projects, too. There is a Project to develop reagents that would provide colored handles for various classes of compounds so that you could tell where they wound up in a chromatographic separation. Then you could hack out these sections or spots and go to work on them. In *p-Phenylazobenzoyl Chloride* (Eastman 5549) we have had such a reagent for sterols, sugars, and amino acids. (Procedural abstract on request.) Now here is one for carbonyl-containing compounds. In this case, instead of a mere abstract we offer you the far greater thrill of working out the entire procedure for yourself. Push off from *J.A.C.S.* 77,6693(1955), where this compound is considered for the isolation of carbonyl compounds of biological origin, trioses in particular. There is a part where they tell how to prepare the reagent. That you now skip.

7462 2-Bromo-2-phenylacetophenone 10 g. . . $3.55

Those who know this compound best call it "desyl bromide." Here's why: *Benzoin* (Eastman 302) is $C_6H_5—\underset{\underset{O}{\|}}{C}—\underset{\underset{OH}{|}}{CH}—C_6H_5$

Subtract an oxygen atom and you have *Desoxybenzoin*, $C_6H_5—\underset{\underset{O}{\|}}{C}—\underset{\underset{H}{|}}{CH}—C_6H_5$ (Eastman 2436)

Hence, when a bromine replaces one of the hydrogens, viz. $C_6H_5—\underset{\underset{O}{\|}}{C}—\underset{\underset{Br}{|}}{CH}—C_6H_5$, it becomes *desyl* bromide. We could probably think of more to say about desyl bromide if we had to, but we don't have to.

4539 2,5-Dichloro-3,6-dihydroxy-p-quinone 5 g. . . $3.00

On this one our hand was forced, though we have no regrets. Its trivial name is chloranilic acid. We have listed the compound for years as Eastman P4539. Now along comes *Technical Bulletin of the Registry of Medical Technologists* with a paper (*27*,160(1957)) where Eastman P4539 is used in a spectrophotometric determination of calcium levels in body fluids. This is kind of delicate work. "P" stands for Practical Grade, meaning a respectable commercial quality chemical, purveyed without anxiety lest there remain a trace of cloudiness when 0.1 gm is dissolved in 10 ml of 0.4% NaOH. Conscience compels us to offer a non-P Eastman 4539 to keep faith with readers of *Technical Bulletin of the Registry of Medical Technologists.*

7439 Diiodophenylarsine $C_6H_5AsI_2$ 5 g. . . $2.95

Page 222 of "Eastman Organic Chemicals, List No. 40" is devoted to a price catalog of 40 liquids arranged in order of refractive index and an offer to supply them in 25-cc glass-stoppered bottles when ordered in lots of 10 or more. After the book was printed, along came *Trifluoroacetic Anhydride* (Eastman 7386) with a refractive index of 1.269 to extend the list at the low end, and now comes this one to stretch it at the other end to 1.840, way beyond 1.7400 where *Diiodomethane* (Eastman 167) had hitherto left it. It is heavy stuff ($D_4^{20} = 2.565$), and dark red is its inherent color, but it's not very volatile (BP 142-144/1 mm) and, as George Joseph Burrows and Eustace Ebenezer Turner of Sydney, Australia, pointed out in 1920, it's a definite chemical entity, not one of those inorganic cookbook broths that have been in use for high-index measurements in mineralogy.

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Zenon Kazenas' (right) new thermoplastic resin carrier gives . . .

Boost to Fluorescent Dyes

A new amide formaldehyde resin, Sulphonamel, designed to make fluorescent dyes lightfast, has just been launched by Switzer Bros. (Cleveland). By increasing the effective life of dyes, the new resin is expected to vastly expand the applications of the dyes in ink and in paints for outdoor use.

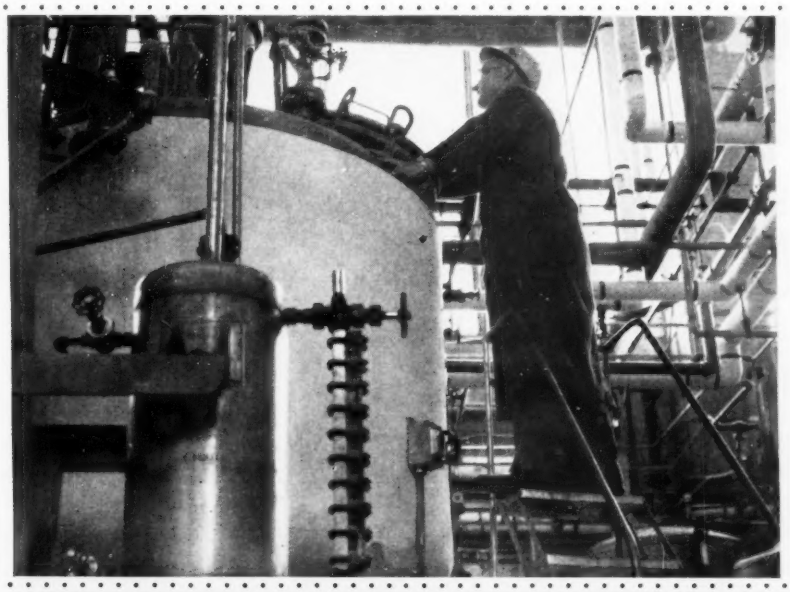
Solving a problem that has impeded the sale of ultrabright colorants for years, the new thermoplastic resin can be ground into a pigment for use in paints and inks (early thermoplastics have been too soft to be finely ground without coalescing). And available thermosetting resins used as color carriers have failed to give lightfastness.

Switzer's new resin, a condensation product of melamine, formaldehyde and aromatic monosulfonamides, has properties that compare favorably with the thermosetting butylated urea-formaldehyde resins of the early '40s and its successor, butylated melamine-formaldehyde resins. They were the first useful materials approaching the requirements of a carrier, but their lightfast qualities left much to be desired.

The new Sulphonamel is extremely brittle (like glass) but is not tough and reportedly may be easily crushed to form a powder of any desired micron size. And its excellent lightfastness is believed to stem from good water resistance of the resin, a property enhanced by the fused, glossy condition and the melamine nature of the material. Along these lines, Switzer's new U.S. patent says: ". . . it has been found that the lightfastness of [this new, colored] pigment is better than that of other colored pigments containing the same soluble dyestuff."

Zenon Kazenas, the inventor, tells *CW* that "because of this property, the resin pigments can also be dissolved in solvent-type volatile vehicles to form coating compositions of varied properties. It can be used in spirit varnish compositions to which film formers, such as vinyl polymers and copolymers and cellulose acetate, have been added. Plasticizers, too, can be used in place of film formers in coating mixes." Joseph Switzer, the company's vice-president of research, adds: "Sulphonamel is insoluble in water, aromatic and aliphatic hydrocarbons, so that paints based on these solvents may carry the pulverized dye resin mixture as if it were a pigment."

Industrially, the resins may prove of interest in paints, lacquers, watercolors, printing inks, paper coatings, fabric dyeing and coating, cosmetics and molded and extruded plastic products. A substantial market in dope-dyed acetate yarns has been built up in England.



CONDENSATIONS – ALKYLATIONS IN STANDARD EQUIPMENT WITH MHI SODIUM HYDRIDE OIL DISPERSION

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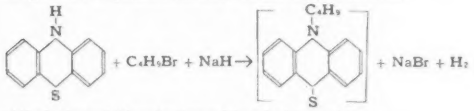

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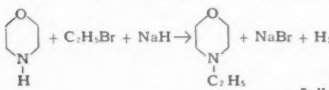

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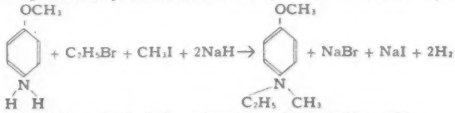

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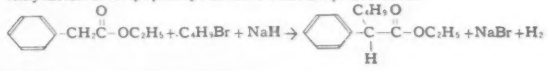

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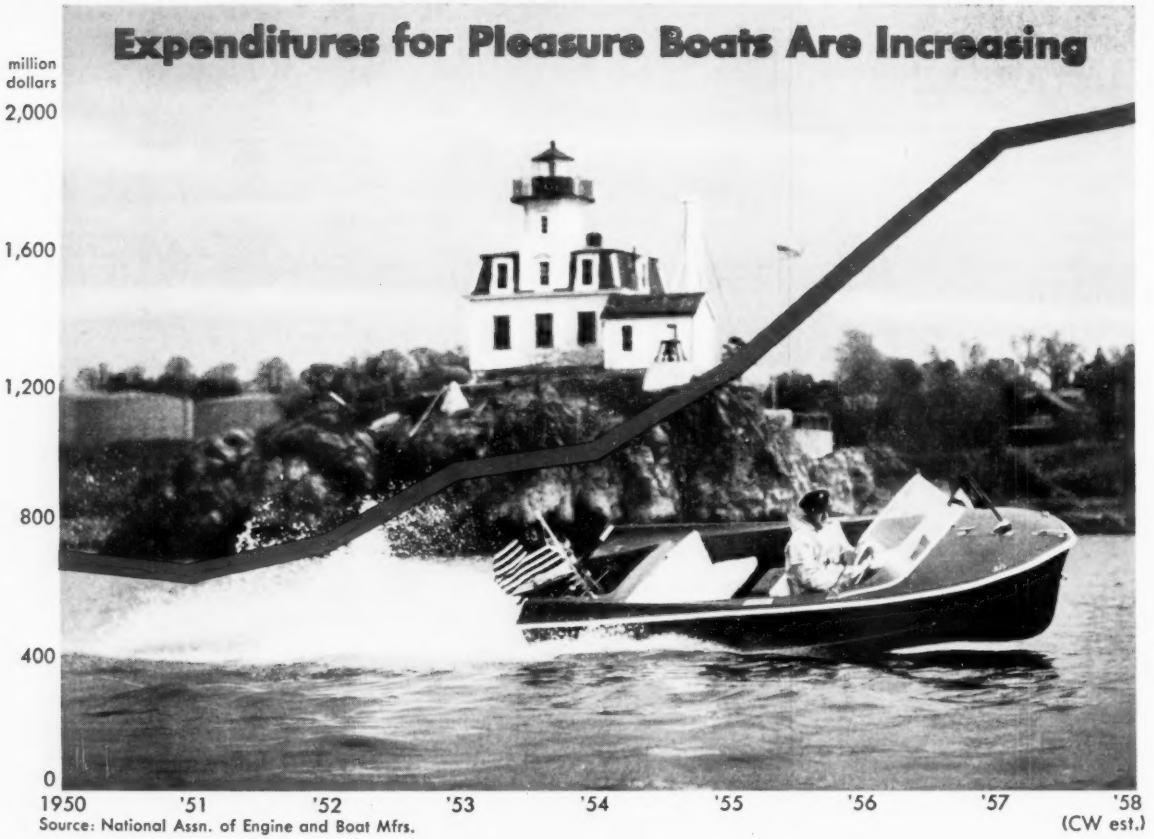

Boaters Hoist Chemical Profit Pennant

The record crowd that flocked to New York's National Motorboat Show the past week underscored the growing popularity of pleasure boating. And chemical makers are hoisting a profit pennant for sales in this industry. Last year, amateur sailors paid out some $1.9 billion for equipment and supplies. While the major share of this was for new and used crafts, motors, insurance, etc., a profitable slice was channeled into various chemical-derived products. Here's where the pleasure boat industry added to chemical sales in '57:

- About 379 million gal. of gasoline, 20.5 million gal. of diesel fuel, 19 million gal. of lubricating oil were used.
- Sprucing up boats took 9.8 million gal. of paints and varnishes; in '56, it was 8.5 million gal.
- Aluminum use totalled about 45 million lbs.
- Hulls, boat coverings consumed some 25 million lbs. of glass fiber, 3 million lbs. more than in '56.
- Sales of synthetic cordage—Dacron, nylon, polyethylene, etc.—total 1.65 million lbs.
- Of the 8 million sq. ft. of sail cloth sold, 75% was made of Dacron—about 300,000 lbs: of the fiber.

Indicating that use of chemicals in pleasure boating will continue to gain, U.S. Rubber recently announced a new plastic-rubber blend, Royalite, for use in hull construction (*see above*).

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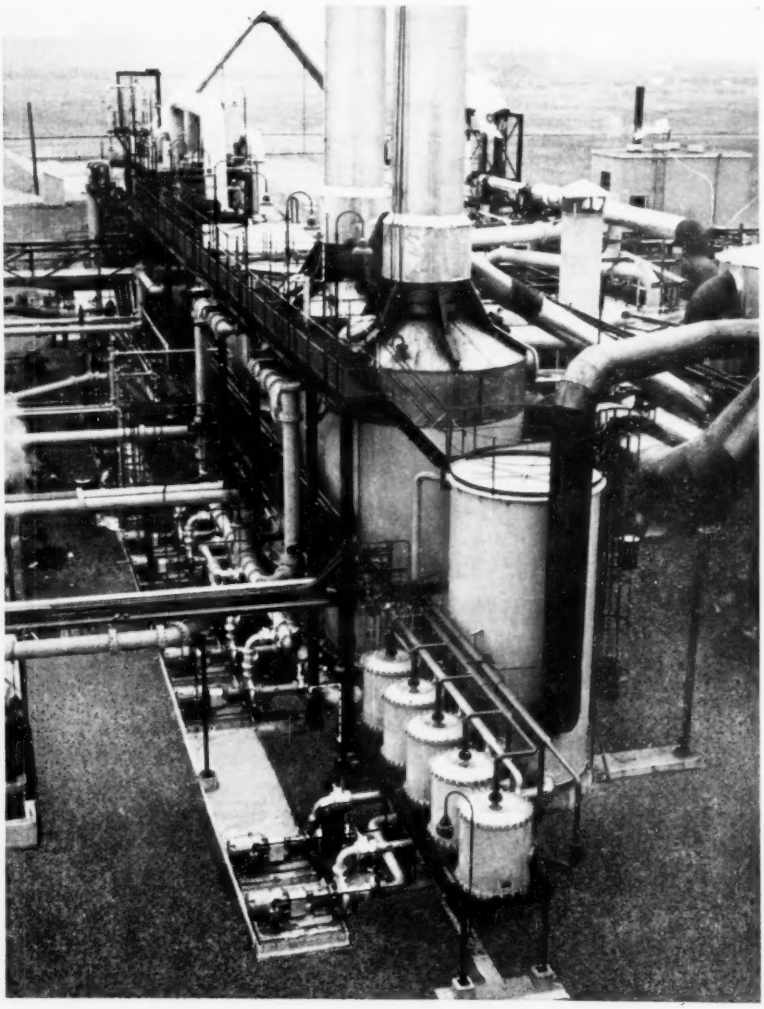

Shipments are now going out by rail, truck and barge from General Chemical's newest sulfuric acid plant, at Elizabeth, New Jersey. Serving northern New Jersey, metropolitan New York and New England, this plant is the 21st in General's coast-to-coast chain of sulfuric acid producing locations in this country and Canada.*

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For information on how this plant can serve you, write or phone nearest office listed below.

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